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NUREG-1418

Characteristics of Low-Level Radioactive Waste Disposed During 1987 Through 1989

U.S. Nuclear Regulatory Commission

Office of Nuclear Material Safety and Safeguards

G. W. Roles



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Manuscript Completed: November 1990
Date Published: December 1990

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ABSTRACT

This report presents the volume, activity, and radionuclide distributions in low-level radioactive waste (LLW) disposed during 1987 through 1989 at the commercial disposal facilities located near Barnwell, SC, Richland, WA, and Beatty, NV. The report has been entirely assembled from descriptions of waste provided in LLW shipment manifests. Individual radionuclide distributions are listed as a function of waste class, of general industry, and of waste stream. In addition, information is presented about disposal of wastes containing chelating agents, about use of solidification media, about the distribution of radiation levels at the surfaces of waste containers, and about the distribution of waste container sizes. Considerably more information is presented about waste disposed at the Richland and Beatty disposal facilities than at the Barnwell disposal facility.

CONTENTS

	<u>Page</u>
Abstract	iii
Acknowledgments	xi
1. Introduction	1
2. Derivation of Report Information	1
3. Basic Volume and Activity Distributions	4
4. Volume and Activity Distributions per General Industry	12
5. Volumes and Gross Activities per Waste Stream	20
6. Radionuclides in LLW in Significant Quantities	40
7. Distribution of Long-Lived Radionuclides	40
8. Other Information	49
References	52
Glossary	54
Appendix A. Disposal Facility Radionuclide Distribution by Waste Class	
Appendix B. Isotopic Distribution by Waste Class and General Industry	
Appendix C. Isotopic Distribution by Waste Stream for U.S. Ecology Disposal Facilities	
Appendix D. Richland 1989 Radionuclide Distribution by Waste Stream and Industry	
Appendix E. Use of Solidification and Sorbent Media at U.S. Ecology Disposal Facilities	
Appendix F. Richland 1989 Radionuclide Distribution by Solidification and Sorbent Media	

TABLES

1. 1987 Gross Volume and Activity Distribution	5
2. 1988 Gross Volume and Activity Distribution	6

CONTENTS (CONTINUED)

	<u>Page</u>
3. 1989 Gross Volume and Activity Distribution	7
4. 1987 Gross Volume and Activity Distribution by Class and Facility	8
5. 1988 Gross Volume and Activity Distribution by Class and Facility	9
6. 1989 Gross Volume and Activity Distribution by Class and Facility	10
7. Gross Distribution of Volume and Activity in Class A Waste	11
8. Barnwell 1987 Volume and Activity Sorted by General Industry	13
9. Barnwell 1988 Volume and Activity Sorted by General Industry	13
10. Barnwell 1989 Volume and Activity Sorted by General Industry	14
11. Richland 1987 Volume and Activity Sorted by General Industry	14
12. Richland 1988 Volume and Activity Sorted by General Industry	15
13. Richland 1989 Volume and Activity Sorted by General Industry	15
14. Beatty 1987 Volume and Activity Sorted by General Industry	16
15. Beatty 1988 Volume and Activity Sorted by General Industry	16
16. Beatty 1989 Volume and Activity Sorted by General Industry	17
17. Total Waste Volume and Activity Sorted by General Industry	18
18. Total Waste Volume and Activity Sorted by General Industry and Disposal Facility	19
19. Waste Descriptions Used by Disposal Facility Operators	21
20. Barnwell 1987 Waste Volume and Activity by Waste Stream and Class	22
21. Barnwell 1987 Waste Volume by Waste Stream and Physical Form	23
22. Barnwell 1988 Waste Volume and Activity by Waste Stream and Class	24
23. Barnwell 1988 Waste Volume by Waste Stream and Physical Form	25
24. Barnwell 1989 Waste Volume and Activity by Waste Stream and Class	26
25. Barnwell 1989 Waste Volume by Waste Stream and Physical Form	27

CONTENTS (CONTINUED)

	<u>Page</u>
26. Richland 1987 Waste Volume by Waste Stream and Class	28
27. Richland 1987 Waste Activity by Waste Stream and Class	29
28. Richland 1988 Waste Volume by Waste Stream and Class	30
29. Richland 1988 Waste Activity by Waste Stream and Class	31
30. Richland 1989 Waste Volume by Waste Stream and Class	32
31. Richland 1989 Waste Activity by Waste Stream and Class	33
32. Beatty 1987 Waste Volume by Waste Stream and Class	34
33. Beatty 1987 Waste Activity by Waste Stream and Class	35
34. Beatty 1988 Waste Volume by Waste Stream and Class	36
35. Beatty 1988 Waste Activity by Waste Stream and Class	37
36. Beatty 1989 Waste Volume by Waste Stream and Class	38
37. Beatty 1989 Waste Activity by Waste Stream and Class	39
38. 1987 Radionuclides in Quantities Exceeding 100 Curies	41
39. 1988 Radionuclides in Quantities Exceeding 100 Curies	42
40. 1989 Radionuclides in Quantities Exceeding 100 Curies	43
41. 1987 Radionuclides Having Half-Lives Exceeding 100 Years	44
42. 1988 Radionuclides Having Half-Lives Exceeding 100 years	45
43. 1989 Radionuclides Having Half-Lives Exceeding 100 Years	46
44. U.S. Ecology 1989 Distribution of Activity Among General Industries for Selected Radionuclides	48
45. LLW Delivered to U.S. Ecology Disposal Facilities and Containing Chelating Agents in Concentrations Exceeding 0.1 Weight Percent	50
46. U.S. Ecology 1988 and 1989 Distribution of Waste Container Volumes.....	51
47. U.S. Ecology 1988 and 1989 Distribution of Waste Container Surface Radiation Levels	53

CONTENTS (CONTINUED)

	<u>Page</u>
A-1. Barnwell 1987 Radionuclide Distribution by Waste Class	A-2
A-2. Barnwell 1988 Radionuclide Distribution by Waste Class	A-5
A-3. Barnwell 1989 Radionuclide Distribution by Waste Class	A-8
A-4. Richland 1987 Radionuclide Distribution by Waste Class	A-11
A-5. Richland 1988 Radionuclide Distribution by Waste Class	A-15
A-6. Richland 1989 Radionuclide Distribution by Waste Class	A-19
A-7. Beatty 1987 Radionuclide Distribution by Waste Class	A-24
A-8. Beatty 1988 Radionuclide Distribution by Waste Class	A-27
A-9. Beatty 1989 Radionuclide Distribution by Waste Class	A-30
B-1. Beatty 1987 Isotopic Distribution by General Industry	B-2
B-2. Beatty 1988 Isotopic Distribution by General Industry	B-8
B-3. Beatty 1989 Isotopic Distribution by General Industry	B-16
B-4. Richland 1987 Isotopic Distribution by General Industry	B-25
B-5. Richland 1988 Isotopic Distribution by General Industry	B-35
B-6. Richland 1989 Isotopic Distribution by General Industry	B-46
C-1. Richland 1987 Isotopic Distribution by Waste Stream	C-3
C-2. Richland 1988 Isotopic Distribution by Waste Stream	C-27
C-3. Richland 1989 Isotopic Distribution by Waste Stream	C-50
C-4. Beatty 1987 Isotopic Distribution by Waste Stream	C-83
C-5. Beatty 1988 Isotopic Distribution by Waste Stream	C-100
C-6. Beatty 1989 Isotopic Distribution by Waste Stream	C-113
D-1. Richland 1989 Radionuclide Distributions for Colleges	D-2
D-2. Richland 1989 Radionuclide Distributions for Government	D-15
D-3. Richland 1989 Radionuclide Distributions for Hospitals	D-26

CONTENTS (CONTINUED)

	<u>Page</u>
D-4. Richland 1989 Radionuclide Distributions for Industry	D-35
D-5. Richland 1989 Radionuclide Distributions for Utilities	D-57
E-1. Richland 1987 Use of Solidification and Sorbent Media	E-3
E-2. Richland 1988 Use of Solidification and Sorbent Media	E-22
E-3. Richland 1989 Use of Solidification and Sorbent Media	E-53
E-4. Beatty 1987 Use of Solidification and Sorbent Media	E-82
E-5. Beatty 1988 Use of Solidification and Sorbent Media	E-96
E-6. Beatty 1989 Use of Solidification and Sorbent Media	E-114
F-1. Richland 1989 Radionuclide Distribution by Solidification and Sorbent Media	F-2
F-2. Richland 1989 Utility Waste Radionuclide Distribution by Solidification and Sorbent Media	F-86

ACKNOWLEDGMENTS

The author would like to thank the following individuals for their assistance in assembling the data included in this report: Jimmy Still and Sybil Horton of Chem-Nuclear Systems, Inc.; Caroline Martinson, Paul Olliges, and Jay Stovall of U.S. Ecology, Inc.; and Melinda Renner and Jean Hawes of the Utility Data Institute. The author would also like to thank Sharlene McCubbin of the Nuclear Regulatory Commission's (NRC) Division of Contracts and Property Management, Office of Administration; Veta Everett of NRC's Program Implementation Branch, Office of Nuclear Material Safety and Safeguards (NMSS); and Ellen Kraus, the NMSS editor.

1. INTRODUCTION

This report presents the volume, activity, and radionuclide distributions in low-level waste (LLW) disposed during 1987 through 1989 at the commercial disposal facilities located near Barnwell, SC, Richland, WA, and Beatty, NV. The report has been prepared as a source of general LLW data for use by regulatory agencies, disposal facility developers, consultants, and others.

The report begins with a section discussing the derivation of the assembled data. The report then presents the following sections:

- Basic volume and activity distributions
- Volume and activity distributions per general industry
- Volumes and gross activities per waste stream
- Radionuclides in LLW in significant quantities
- Distribution of long-lived radionuclides
- Other information
- References

The report includes a glossary and six appendices. The glossary summarizes the elemental abbreviations used in the report. Appendices A through C list individual radionuclide distributions as a respective function of waste class, general industry, and waste stream. Although the first of these three appendices provides data for all three disposal facilities, the last two appendices provide data for only the Richland and Beatty facilities. Appendix D provides additional information about waste disposed during 1989 at the Richland facility; it lists radionuclide distributions as a function of waste stream and general industry. Appendix E provides general information about use of sorbent and solidification media at the Richland and Beatty facilities. Appendix F expands the information in Appendix E by listing radionuclide distributions as a function of sorbent and solidification media for the Richland facility. All appendices except Appendices D and F consider the years 1987 through 1989; Appendices D and F consider 1989 only.

2. DERIVATION OF REPORT INFORMATION

This report has been entirely assembled from descriptions of waste provided in manifests accompanying LLW shipments to LLW disposal facilities.

Each shipment to a LLW disposal facility is accompanied by manifests and other documentation that describe the shipment contents. Manifests are large, detailed documents containing information required by Nuclear Regulatory Commission (NRC) regulations in Title 10, Code of Federal Regulations, Part 20 (10 CFR Part 20), Department of Transportation Regulations in 49 CFR Part 172, and State regulations and requirements. A manifest consists of a title page, which presents information applicable to the shipment as a whole, plus one or

more continuation sheets, which describe individual containers of waste. A bill of lading must also be included as required by the Interstate Commerce Commission in 49 CFR Part 1054. Additional documentation is usually required by disposal facility license condition.

Three LLW disposal facilities currently operate: the Barnwell, SC disposal facility operated by Chem-Nuclear Systems, Inc. (CNSI), and the Richland, WA, and Beatty, NV, facilities operated by U.S. Ecology, Inc. (USE). Upon receipt of a shipment of LLW, disposal facility operators perform quality control checks on the shipment and the information in the manifest, and transcribe portions of the manifest information into computer recordkeeping systems. The disposal facility operators have independently developed these computer systems to assist them in business activities and in making reports as required by NRC and State regulations and disposal facility license conditions. The computer systems are necessary to store and process the manifest information, which is voluminous. Each year the operators receive thousands of shipment manifests, and each manifest consists of several sheets of paper filled with detailed information about the waste.

Both disposal facility operators carry out quality control procedures to check the accuracy of the information transcription process. USE transcribes any radionuclide having an activity of one microcurie or less as one microcurie. CNSI transcribes the most significant radionuclides, either in terms of quantity or radiological hazard. Some adjustment is performed on very short-lived radionuclides to avoid round-off errors when summing over the individual radionuclides in the shipment.

Over the past several years, NRC has purchased microfiche copies of shipment manifests from the disposal facility operators, as well as computer printouts of the LLW data sorted in different ways. In addition, NRC has contracted with the Utility Data Institute (UDI) to access USE's WASTENET computer system for the Richland and Beatty disposal facilities. (UDI markets a limited number of programs for the WASTENET system based on an agreement with USE.)

These computer systems were created and are owned by the disposal facility operators. Some of the computer printouts, as well as many of the microfiched shipment manifests, contain information that the operators consider copyrighted or business proprietary information. Such information has been excluded from this report.

In assembling the data for this report, the author did not attempt to verify the accuracy of the information reported by waste generators on shipment manifests. In general, therefore, the author presents information as it was provided by the disposal facility operators. But the author did review the results of different printouts to ensure that the information in the printouts was consistent. As part of this process, a few matters came to light that bear mentioning.

First, this report contains considerably more information about waste delivered to the USE disposal facilities than to the CNSI disposal facility. This is mainly because the operators' computer systems store different information in different formats. CNSI was the first operator to develop a computer system to

store manifest information, whereas USE followed a number of years later. The CNSI system stores less information than does the USE system. Furthermore, the CNSI system stores manifest information as summarized across the entire shipment, which makes it difficult to consistently associate a particular type or class of waste with a given container in a shipment. (And has apparently contributed to a few minor discrepancies which may be observed in this report.) Without laboriously reviewing shipment manifests, one cannot precisely determine the radionuclide distributions in different waste streams if more than one waste stream is included in a particular shipment. The newer USE system stores information on a waste container basis. The USE manifest contains features such as index codes that ease computer storage and information processing.

In addition, the wastes are described differently depending on the manifest form. Each operator specifies use of a particular manifest form, and although the manifests used by the two operators are similar, they are not identical (more on this later).

Another consideration is the mutable nature of the data stored in the operators' computer systems. Changes may occur, for example, because subsequent to waste disposal, a waste generator sends a modified shipment manifest to a disposal facility operator. These modifications might reflect an improved estimate of the radionuclide distribution in waste. Consequently, the results of computer programs run today may differ slightly from those run tomorrow, and the data used to prepare this report were assembled over 3 years.

Furthermore, the information provided in LLW shipment manifests is imprecise, reflecting uncertainties in measurements. Although a radioactive isotope is not necessarily absent merely because one hasn't looked for it, the author believes that the radionuclide inventories listed in shipment manifests tend to be conservative. This conservatism can be extreme for radionuclides such as I-129 that are contained in trace quantities in waste and cannot be readily measured using nondestructive measurement techniques. Generators usually estimate the concentrations of these radionuclides in waste by scaling to other, easy-to-measure radionuclides such as Cs-137. Scaling factors are determined by obtaining waste samples and by measuring for the radionuclides of interest using complex radiochemical techniques. The results of the analyses are often below the lower limit of detection (LLD) for the analysis technique. By basing scaling factors on LLD values, generators can exaggerate the reported quantities of these radionuclides by factors considerably greater than 10. (See References 1 and 2.)

Because of these uncertainties, the information in the main body of this report is usually presented in exponential notation using a limited number of significant figures. But this leads to a quandary: too many significant figures implies an inflated accuracy; too few leads to round-off errors. As a compromise, four significant figures are normally used.

All volumes are in units of cubic feet rather than cubic meters, because a cubic foot is the volume unit used on shipment manifests. These volumes all refer to the envelope volume of the container in which the waste is shipped, rather than the volume of the waste within the container. For most wastes, the

volume of the waste will not differ dramatically from that of the container, although activated metal wastes are a notable exception. (These wastes are typically materials such as tubing that contain large voids. The ratio of the waste "full-density" volume -- the volume represented by the elimination of all voids -- to the volume of the waste container seldom exceeds 15 percent.)

All radionuclide activities in the main report are in units of curies (Ci), as are activities in Appendix A. Activities in Appendices B through F are in units of millicuries (mCi). The older curie and millicurie units are used in this report, rather than the newer Becquerel units, because the older units are still customarily used on shipment manifests.

3. BASIC VOLUME AND ACTIVITY DISTRIBUTIONS

Tables 1 through 3 summarize gross volume and activity distributions for the three disposal facilities for the years 1987 through 1989. For these three years, the total waste volume varied over a range of about 420,000 ft³, from a low of 1,430,000 ft³ to a high of 1,850,000 ft³. The activity, however, experienced a more dramatic change. Although the total waste activity reported during 1987 was 270,000 Ci, and during 1988 was 260,000 Ci, the total waste activity reported during 1989 was 870,000 Ci. That is, the total waste activity for 1989 was three times that for either 1987 or 1988. Using 1988 as a comparison, the total 1989 activity rose by a factor of nearly five for the Beatty facility, a factor of 3.1 for the Richland facility, and a factor of 3.3 for the Barnwell facility. Of note is the 476,000-curie increase in Class C waste activity at the Barnwell facility, which resulted generally from disposal of activated metals dominated by isotopes having short half-lives.

The fractional distribution of the waste volume among the three waste classes is similar for all three years. Class A waste comprises 96-97 percent of the volume, Class B waste 2-3 percent, and Class C waste 0.5-1 percent. However, the fractional distribution of the waste activity differs. In 1987 and 1988, Class A waste comprised 10-11 percent of the activity, Class B waste 23-25 percent, and Class C waste 65-66 percent. In 1989, more activity shifted to Class C waste. Seventy-eight percent of the activity was in Class C waste, whereas only 19 percent was in Class B waste and 3 percent in Class A waste.

Tables 4 through 6 present the same data as do Tables 1 through 3, but the focus is different. That is, Tables 4 through 6 emphasize the comparison of one disposal facility with another. The Barnwell facility consistently received over half the waste volume and over three-quarters of the waste activity.

(Information about isotopic distributions in LLW is provided in Appendix A. This appendix lists inventories of all reported radionuclides as a function of year, disposal facility, and waste class.)

Table 7 provides additional information about the volume and activity distribution in Class A waste. In 10 CFR 61.56, NRC regulations require disposal of Class B and C wastes in a manner that provides structural stability, where structural stability can be provided by the waste form itself,

Table 1. 1987 Gross Volume and Activity Distribution

<u>Site and Class</u>	<u>Volume (ft³)</u>	<u>Activity (Ci)</u>
<u>Barnwell</u>		
Class A	9.175E+5 (96.0%)	1.953E+4 (9.3%)
Class B	3.121E+4 (3.3%)	2.830E+4 (13.4%)
Class C	7.090E+3 (0.7%)	1.633E+5 (77.4%)
Total	9.558E+5	2.111E+5
<u>Richland</u>		
Class A	5.478E+5 (98.4%)	4.187E+3 (8.8%)
Class B	7.225E+3 (1.3%)	3.023E+4 (63.7%)
Class C	1.584E+3 (0.3%)	1.307E+4 (27.5%)
Total	5.566E+5	4.748E+4
<u>Beatty</u>		
Class A	3.317E+5 (99.8%)	2.355E+3 (21.2%)
Class B	6.770E+2 (0.2%)	8.590E+3 (77.4%)
Class C	3.122E+1 (0.01%)	1.564E+2 (1.4%)
Total	3.324E+5	1.110E+4
<u>Total</u>		
Class A	1.797E+6 (97.4%)	2.607E+4 (9.7%)
Class B	3.911E+4 (2.1%)	6.711E+4 (24.9)
Class C	8.705E+3 (0.5%)	1.765E+5 (65.4%)
Total	1.845E+6	2.697E+5

Table 2. 1988 Gross Volume and Activity Distribution

<u>Site and Class</u>	<u>Volume (ft³)</u>	<u>Activity (Ci)</u>
<u>Barnwell</u>		
Class A	8.889E+5 (95.4%)	2.124E+4 (9.7%)
Class B	3.350E+4 (3.6%)	3.374E+4 (15.4%)
Class C	9.570E+3 (1.0%)	1.640E+5 (74.9%)
Total	9.320E+5	2.190E+5
<u>Richland</u>		
Class A	3.968E+5 (98.4%)	4.450E+3 (13.9%)
Class B	4.245E+3 (1.1%)	2.299E+4 (71.7%)
Class C	2.403E+3 (0.6%)	4.628E+3 (14.4%)
Total	4.034E+5	3.207E+4
<u>Beatty</u>		
Class A	9.250E+4 (99.0%)	2.549E+3 (29.3%)
Class B	6.881E+2 (0.7%)	3.590E+3 (41.3%)
Class C	2.276E+2 (0.2%)	2.553E+3 (29.4%)
Total	9.341E+4	8.691E+3
<u>Total</u>		
Class A	1.378E+6 (96.4%)	2.824E+4 (10.9%)
Class B	3.843E+4 (2.7%)	6.032E+4 (23.2%)
Class C	1.220E+4 (0.9%)	1.712E+5 (65.9%)
Total	1.429E+6	2.598E+5

Table 3. 1989 Gross Volume and Activity Distribution

<u>Site and Class</u>	<u>Volume (ft³)</u>	<u>Activity (Ci)</u>
<u>Barnwell</u>		
Class A	1.061E+6 (96.2%)	1.788E+4 (2.5%)
Class B	3.015E+4 (2.7%)	6.742E+4 (9.3%)
<u>Class C</u>	<u>1.224E+4</u> (1.1%)	<u>6.399E+5</u> (88.2%)
Total	1.103E+6	7.252E+5
<u>Richland</u>		
Class A	4.007E+5 (98.1%)	6.503E+3 (6.6%)
Class B	4.306E+3 (1.1%)	5.980E+4 (60.4%)
<u>Class C</u>	<u>3.247E+3</u> (0.8%)	<u>3.276E+4</u> (33.1%)
Total	4.083E+5	9.906E+4
<u>Beatty</u>		
Class A	1.137E+5 (97.8%)	4.251E+3 (10.0%)
Class B	1.496E+3 (1.3%)	3.401E+4 (79.7%)
<u>Class C</u>	<u>1.029E+3</u> (0.9%)	<u>4.417E+3</u> (10.3%)
Total	1.162E+5	4.268E+4
<u>Total</u>		
Class A	1.575E+6 (96.7%)	2.864E+4 (3.3%)
Class B	3.595E+4 (2.2%)	1.612E+5 (18.6%)
<u>Class C</u>	<u>1.651E+4</u> (1.0%)	<u>6.770E+5</u> (78.1%)
Total	1.628E+6	8.669E+5

Table 4. 1987 Gross Volume and Activity Distribution by Class and Facility

<u>Class</u>	<u>Barnwell</u>	<u>Richland</u>	<u>Beatty</u>	<u>Total</u>
<u>Class A</u>				
Vol. (ft ³)	917,478 (51%)	547,863 (30%)	331,700 (18%)	1,797,019
Act. (Ci)	19,527 (75%)	4,187 (16%)	2,355 (9%)	26,068
<u>Class B</u>				
Vol. (ft ³)	31,208 (80%)	7,225 (18%)	677 (2%)	39,110
Act. (Ci)	28,296 (42%)	30,227 (45%)	8,590 (13%)	67,113
<u>Class C</u>				
Vol. (ft ³)	7,090 (81%)	1,584 (18%)	31 (0.4%)	8,705
Act. (Ci)	163,275 (93%)	13,070 (7%)	156 (0.09%)	176,502
<u>Total</u>				
Vol. (ft ³)	955,776 (52%)	556,650 (30%)	332,408 (18%)	1,844,834
Act. (Ci)	211,098 (78%)	47,484 (18%)	11,101 (4%)	269,683

Table 5. 1988 Gross Volume and Activity Distribution by Class and Facility

<u>Class</u>	<u>Barnwell</u>	<u>Richland</u>	<u>Beatty</u>	<u>Total</u>
<u>Class A</u>				
Vol. (ft ³)	888,903 (64.5%)	396,751 (28.8%)	92,496 (6.7%)	1,378,150
Act. (Ci)	21,244 (75.2%)	4,450 (15.8%)	2,549 (9.0%)	28,242
<u>Class B</u>				
Vol. (ft ³)	33,501 (87.2%)	4,245 (11.0%)	688 (1.8%)	38,434
Act. (Ci)	33,743 (55.9%)	22,990 (38.1%)	3,590 (6.0%)	60,323
<u>Class C</u>				
Vol. (ft ³)	9,570 (78.4%)	2,403 (19.7%)	228 (1.9%)	12,201
Act. (Ci)	164,048 (95.8%)	4,628 (2.7%)	2,553 (1.5%)	171,228
<u>Total</u>				
Vol. (ft ³)	931,974 (65.2%)	403,399 (28.2%)	93,412 (6.5%)	1,428,785
Act. (Ci)	219,034 (84.3%)	32,068 (12.3%)	8,691 (3.3%)	259,793

Table 6. 1989 Gross Volume and Activity Distribution by Class and Facility

<u>Class</u>	<u>Barnwell</u>	<u>Richland</u>	<u>Beatty</u>	<u>Total</u>
<u>Class A</u>				
Vol. (ft ³)	1,060,914 (67%)	400,738 (25%)	113,697 (7%)	1,575,349
Act. (Ci)	17,885 (62%)	6,503 (23%)	4,251 (15%)	28,639
<u>Class B</u>				
Vol. (ft ³)	30,148 (84%)	4,306 (12%)	1,496 (4%)	35,950
Act. (Ci)	67,419 (42%)	59,804 (37%)	34,012 (21%)	161,235
<u>Class C</u>				
Vol. (ft ³)	12,238 (74%)	3,247 (20%)	1,029 (6%)	16,514
Act. (Ci)	639,859 (95%)	32,755 (5%)	4,417 (0.7%)	677,032
<u>Total</u>				
Vol. (ft ³)	1,103,300 (68%)	408,291 (25%)	116,222 (7%)	1,627,813
Act. (Ci)	725,164 (84%)	99,062 (11%)	42,680 (5%)	866,905

Table 7. Gross Distribution of Volume and Activity in Class A Waste

<u>Year</u>		<u>Barnwell</u>	<u>Richland</u>	<u>Beatty</u>	<u>Total</u>
<u>1987</u>					
AS ^a - Vol. (ft ³)		1.339E+5	1.291E+4	1.472E+4	1.615E+5
Act. (Ci)		1.636E+4	2.039E+2	2.837E+2	1.685E+4
AU ^a - Vol. (ft ³)		7.836E+5	5.349E+5	3.170E+5	1.635E+6
Act. (Ci)		3.163E+3	3.983E+3	2.071E+3	9.217E+3
A ^a - Vol. (ft ³)		9.175E+5	5.478E+5	3.317E+5	1.797E+6
Act. (Ci)		1.953E+4	4.187E+3	2.355E+3	2.607E+4
<u>1988</u>					
AS - Vol. (ft ³)		1.273E+5	3.949E+3	1.598E+3	1.328E+5
Act. (Ci)		1.827E+4	5.215E+2	1.025E+3	1.982E+4
AU - Vol. (ft ³)		7.616E+5	3.928E+5	9.090E+4	1.245E+6
Act. (Ci)		2.970E+3	3.928E+3	1.524E+3	8.422E+3
A - Vol. (ft ³)		8.889E+5	3.968E+5	9.250E+4	1.378E+6
Act. (Ci)		2.124E+4	4.450E+3	2.549E+3	2.824E+4
<u>1989</u>					
AS - Vol. (ft ³)		8.914E+4	3.614E+2	2.025E+3	9.153E+4
Act. (Ci)		1.110E+4	8.446E-1	1.090E+3	1.219E+4
AU - Vol. (ft ³)		9.718E+5	4.004E+5	1.117E+5	1.484E+6
Act. (Ci)		6.784E+3	6.503E+3	3.361E+3	1.645E+4
A - Vol. (ft ³)		1.061E+6	4.007E+5	1.137E+5	1.575E+6
Act. (Ci)		1.788E+4	6.503E+3	4.251E+3	2.864E+4

a. AS: Class A, stable; AU: Class A, unstable; A: Total Class A.

by processing the waste to a stable form, or by placing the waste in a disposal container or structure that provides stability after disposal.

Waste generators usually provide structural stability by either processing the waste into a stable form or by placing the waste into a high-integrity container (HIC). Although not required by Part 61, Class A wastes are also frequently disposed in a stable form. Over the three years considered, from 43 to 70 percent of the total Class A activity was disposed in a stable form. This is sometimes because of disposal facility license conditions that are more restrictive than Part 61, and sometimes because of operational convenience to a generator.

4. VOLUME AND ACTIVITY DISTRIBUTIONS PER GENERAL INDUSTRY

For each of the three disposal facilities, Tables 8 through 16 summarize the distribution of waste volume and activity as a function of waste class and general category of waste generator. Five categories of waste generators are listed for each table. CNSI denotes these categories as: nuclear utilities, hospitals, colleges, government, and industry (Tables 8 through 10). USE denotes these categories in a similar manner (Tables 11 through 16). For all tables, waste volumes and activities are tracked through any waste brokers and processors back to the original generator. For example, if a nuclear utility sends waste to a processor for compaction, and then the processor sends the waste to a disposal facility, the waste is considered utility waste, rather than industry waste. (Tracking wastes through processors increases the difficulty of minimizing round-off errors during data entry, which can lead to minor computational discrepancies.)

Assuming that the categories denoted by the two operators correspond, the distribution across all disposed waste is estimated by combining the information in the nine tables. The results are in Tables 17 and 18.

Table 17 compares volumes and activities as a function of general industry and waste class. Utilities consistently generated the bulk of the waste volume and activity. For each year from 1987 through 1989, utilities generated from 52 to 57 percent of the volume and from 82 to 84 percent of the activity. Most of this activity was short-lived and was contained in Class C waste. Much of the remaining volume and activity was generated by industrial generators.

Table 18 compares volumes and gross activities as a function of general industry and disposal facility. Waste from different industries are distributed unequally among the three disposal facilities. For example, most of the waste volume and activity generated by nuclear utilities was delivered to the Barnwell facility. Depending on the year, Barnwell received from 65 to 78 percent of the utility waste volume and from 91 to 95 percent of the utility waste activity. Most of this activity was from short-lived isotopes such as Co-60. The Barnwell facility also received most of the activity generated by government generators, although not necessarily most of the volume. On the other hand, Barnwell received a small fraction of the waste generated by hospitals. Depending on the year, Barnwell received only 3 to 6 percent of the hospital waste volume and from 0.1 to 2 percent of the hospital waste activity. Most of the hospital waste volume was delivered to the Richland facility, and,

Table 8. Barnwell 1987 Volume and Activity Sorted by General Industry

<u>Class</u>	<u>Utilities</u>	<u>Hospitals</u>	<u>College or University</u>	<u>Government</u>	<u>Private Industry</u>	<u>Total</u>
<u>Class A</u>						
Vol. (ft ³)	5.883E+5	9.740E+2	1.088E+4	5.935E+4	2.580E+5	9.175E+5
Act. (Ci)	1.851E+4	1.149E-1	1.207E+1	1.532E+2	8.501E+2	1.953E+4
<u>Class B</u>						
Vol. (ft ³)	2.998E+4		2.630E+1	1.649E+2	1.038E+3	3.121E+4
Act. (Ci)	1.957E+4		3.736E+0	5.932E+3	2.795E+3	2.830E+4
<u>Class C</u>						
Vol. (ft ³)	6.933E+3		8.200E+0		1.484E+2	7.090E+3
Act. (Ci)	1.629E+5		1.040E-1		3.301E+2	1.633E+5
<u>Total</u>						
Vol. (ft ³)	6.252E+5	9.740E+2	1.091E+4	5.951E+4	2.592E+5	9.558E+5
Act. (Ci)	2.010E+5	1.149E-1	1.591E+1	6.086E+3	3.975E+3	2.111E+5

Table 9. Barnwell 1988 Volume and Activity Sorted by General Industry

<u>Class</u>	<u>Utilities</u>	<u>Hospitals</u>	<u>College or University</u>	<u>Government</u>	<u>Private Industry</u>	<u>Total</u>
<u>Class A</u>						
Vol. (ft ³)	5.568E+5	7.834E+2	1.118E+4	6.771E+4	2.525E+5	8.889E+5
Act. (Ci)	1.999E+4	1.066E-1	1.376E+1	1.617E+2	1.078E+3	2.124E+4
<u>Class B</u>						
Vol. (ft ³)	3.196E+4		1.160E+1	3.429E+2	1.190E+3	3.350E+4
Act. (Ci)	2.068E+4		5.391E-1	8.769E+3	4.293E+3	3.374E+4
<u>Class C</u>						
Vol. (ft ³)	8.307E+3		2.210E+1	5.490E+1	1.187E+3	9.570E+3
Act. (Ci)	1.620E+5		1.583E+3	3.117E+2	1.797E+2	1.640E+5
<u>Total</u>						
Vol. (ft ³)	5.970E+5	7.834E+2	1.122E+4	6.810E+4	2.548E+5	9.320E+5
Act. (Ci)	2.026E+5	1.066E-1	1.597E+3	9.243E+3	5.550E+3	2.190E+5

Table 10. Barnwell 1989 Volume and Activity Sorted by General Industry

<u>Class</u>	<u>Utilities</u>	<u>Hospitals</u>	<u>College or University</u>	<u>Government</u>	<u>Private Industry</u>	<u>Total</u>
<u>Class A</u>						
Vol. (ft ³)	6.239E+5	2.063E+3	1.623E+4	8.505E+4	3.337E+5	1.061E+6
Act. (Ci)	1.639E+4	2.100E+0	2.935E+1	1.348E+2	1.332E+3	1.788E+4
<u>Class B</u>						
Vol. (ft ³)	2.839E+4	5.710E+0	5.390E+1	6.236E+2	1.070E+3	3.015E+4
Act. (Ci)	2.500E+4	4.867E-1	5.482E+2	1.115E+4	3.072E+4	6.742E+4
<u>Class C</u>						
Vol. (ft ³)	1.195E+4	7.000E-2	7.500E+0	6.256E+1	2.143E+2	1.224E+4
Act. (Ci)	6.394E+5	1.000E-5	6.122E+1	3.187E+2	1.045E+2	6.399E+5
<u>Total</u>						
Vol. (ft ³)	6.642E+5	2.069E+3	1.629E+4	8.574E+4	3.350E+5	1.103E+6
Act. (Ci)	6.808E+5	2.587E+0	6.387E+2	1.161E+4	3.216E+4	7.252E+5

Table 11. Richland 1987 Volume and Activity Sorted by General Industry

	<u>Class</u>	<u>Colleges</u>	<u>Government</u>	<u>Hospitals</u>	<u>Industry</u>	<u>Utilities</u>	<u>Total</u>
AS ^a	Vol (ft ³)	1.500E+1	1.650E+2	9.000E+1	1.128E+3	1.151E+4	1.291E+4
	Act (Ci)	5.674E+0	1.268E-2	1.315E-1	5.929E-1	1.975E+2	2.039E+2
AU ^a	Vol (ft ³)	3.522E+4	1.116E+4	2.702E+4	2.104E+5	2.512E+5	5.349E+5
	Act (Ci)	8.449E+1	1.049E+2	3.444E+1	2.029E+3	1.730E+3	3.983E+3
A ^a	Vol (ft ³)	3.523E+4	1.133E+4	2.711E+4	2.115E+5	2.627E+5	5.478E+5
	Act (Ci)	9.017E+1	1.049E+2	3.457E+1	2.030E+3	1.927E+3	4.187E+3
B	Vol (ft ³)		7.567E+1	3.010E+0	3.101E+2	6.836E+3	7.225E+3
	Act (Ci)		9.755E+2	4.005E-3	2.601E+4	3.238E+3	3.023E+4
C	Vol (ft ³)	8.651E+1	3.675E+2	1.730E+2	4.050E+2	5.519E+2	1.584E+3
	Act (Ci)	3.345E-1	1.398E+0	8.452E-1	9.891E+2	1.208E+4	1.307E+4
Tot	Vol (ft ³)	3.532E+4	1.177E+4	2.728E+4	2.122E+5	2.701E+5	5.566E+5
	Act (Ci)	9.050E+1	1.082E+3	3.542E+1	2.903E+4	1.724E+4	4.748E+4

a. AS: Class A, stable; AU: Class A, unstable; A: total Class A.

Table 12. Richland 1988 Volume and Activity Sorted by General Industry

<u>Class</u>	<u>Colleges</u>	<u>Government</u>	<u>Hospitals</u>	<u>Industry</u>	<u>Utilities</u>	<u>Total</u>
AS ^a	Vol (ft ³)	1.399E+2	3.041E+2		7.500E+0	3.497E+3
	Act (Ci)	5.189E-1	4.507E+1		3.414E-1	4.755E+2
AU ^a	Vol (ft ³)	3.025E+4	1.234E+4	1.920E+4	1.599E+5	3.928E+5
	Act (Ci)	1.277E+2	9.124E+1	7.585E+1	2.455E+3	3.928E+3
A ^a	Vol (ft ³)	3.039E+4	1.264E+4	1.920E+4	1.599E+5	3.968E+5
	Act (Ci)	1.282E+2	1.363E+2	7.585E+1	2.456E+3	4.450E+3
B	Vol (ft ³)	7.500E+0	1.900E+1		2.998E+2	3.919E+3
	Act (Ci)	3.555E-2	1.112E+2		2.072E+4	2.162E+3
C	Vol (ft ³)		1.050E+2		6.180E+1	2.236E+3
	Act (Ci)		4.290E-1		4.011E+0	4.623E+3
Tot	Vol (ft ³)	3.040E+4	1.277E+4	1.920E+4	1.603E+5	4.034E+5
	Act (Ci)	1.282E+2	2.480E+2	7.585E+1	2.318E+4	3.207E+4

a. AS: Class A, stable; AU: Class A, unstable; A: total Class A.

Table 13. Richland 1989 Volume and Activity Sorted by General Industry

<u>Class</u>	<u>Colleges</u>	<u>Government</u>	<u>Hospitals</u>	<u>Industry</u>	<u>Utilities</u>	<u>Total</u>
AS ^a	Vol (ft ³)		7.500E+0	6.800E-1	2.224E+2	1.308E+2
	Act (Ci)		2.221E-3	1.500E-5	7.552E-3	8.348E-1
AU ^a	Vol (ft ³)	3.933E+4	2.225E+4	2.501E+4	1.650E+5	1.488E+5
	Act (Ci)	1.561E+2	2.702E+1	7.248E+1	3.052E+3	3.194E+3
A ^a	Vol (ft ³)	3.933E+4	2.225E+4	2.501E+4	1.652E+5	1.489E+5
	Act (Ci)	1.561E+2	2.702E+1	7.248E+1	3.052E+3	3.195E+3
B	Vol (ft ³)		7.500E+0	1.500E+1	1.285E+2	4.155E+3
	Act (Ci)		1.155E+1	9.623E-2	5.590E+4	3.891E+3
C	Vol (ft ³)	1.500E+1	1.315E+2		5.032E+2	2.597E+3
	Act (Ci)	3.131E-1	5.212E-1		7.091E+1	3.268E+4
Tot	Vol (ft ³)	3.935E+4	2.239E+4	2.503E+4	1.658E+5	1.557E+5
	Act (Ci)	1.564E+2	3.909E+1	7.257E+1	5.902E+4	3.977E+4

a. AS: Class A, stable; AU: Class A, unstable; A: total Class A.

Table 14. Beatty 1987 Volume and Activity Sorted by General Industry

	<u>Class</u>	<u>Colleges</u>	<u>Government</u>	<u>Hospitals</u>	<u>Industry</u>	<u>Utilities</u>	<u>Total</u>
AS ^a	Vol (ft ³)				4.811E+2	1.424E+4	1.472E+4
	Act (Ci)				4.184E+0	2.795E+2	2.837E+2
AU ^a	Vol (ft ³)	9.900E+2	6.125E+4		1.974E+5	5.735E+4	3.170E+5
	Act (Ci)	5.472E-1	5.293E+0		9.119E+2	1.153E+3	2.071E+3
A ^a	Vol (ft ³)	9.900E+2	6.125E+4		1.979E+5	7.159E+4	3.317E+5
	Act (Ci)	5.472E-1	5.293E+0		9.161E+2	1.433E+3	2.355E+3
B	Vol (ft ³)				2.876E+2	3.894E+2	6.770E+2
	Act (Ci)				8.390E+3	1.998E+2	8.590E+3
C	Vol (ft ³)				3.122E+1		3.122E+1
	Act (Ci)				1.564E+2		1.564E+2
Tot	Vol (ft ³)	9.900E+2	6.125E+4		1.982E+5	7.198E+4	3.324E+5
	Act (Ci)	5.472E-1	5.293E+0		9.463E+3	1.632E+3	1.110E+4

a. AS: Class A, stable; AU: Class A, unstable; A: total Class A.

Table 15. Beatty 1988 Volume and Activity Sorted by General Industry

	<u>Class</u>	<u>Colleges</u>	<u>Government</u>	<u>Hospitals</u>	<u>Industry</u>	<u>Utilities</u>	<u>Total</u>
AS ^a	Vol (ft ³)				2.365E+2	1.361E+3	1.598E+3
	Act (Ci)				2.428E+0	1.023E+3	1.025E+3
AU ^a	Vol (ft ³)	2.571E+3	6.444E+3	1.067E+3	5.142E+4	2.940E+4	9.090E+4
	Act (Ci)	8.184E+0	5.123E+0	4.963E+0	2.624E+2	1.243E+3	1.524E+3
A ^a	Vol (ft ³)	2.571E+3	6.444E+3	1.067E+3	5.166E+4	3.076E+4	9.250E+4
	Act (Ci)	8.184E+0	5.123E+0	4.963E+0	2.648E+2	2.266E+3	2.549E+3
B	Vol (ft ³)		2.250E+1	4.550E+0	4.791E+2	1.820E+2	6.881E+2
	Act (Ci)		3.375E+0	4.430E-2	3.411E+3	1.753E+2	3.590E+3
C	Vol (ft ³)	2.861E+1			1.990E+2		2.276E+2
	Act (Ci)	5.240E+2			2.029E+3		2.553E+3
Tot	Vol (ft ³)	2.599E+3	6.467E+3	1.072E+3	5.233E+4	3.094E+4	9.341E+4
	Act (Ci)	5.322E+2	8.498E+0	5.007E+0	5.705E+3	2.441E+3	8.691E+3

a. AS: Class A, stable; AU: Class A, unstable; A: total Class A.

Table 16. Beatty 1989 Volume and Activity Sorted by General Industry

	<u>Class</u>	<u>Colleges</u>	<u>Government</u>	<u>Hospitals</u>	<u>Industry</u>	<u>Utilities</u>	<u>Total</u>
AS ^a	Vol (ft ³)	1.168E+2	8.687E+1	2.303E+1	4.074E+2	1.391E+3	2.025E+3
	Act (Ci)	1.065E+0	1.297E+1	3.063E+0	9.215E+0	1.064E+3	1.090E+3
AU ^a	Vol (ft ³)	9.103E+3	5.561E+3	6.981E+3	6.445E+4	2.557E+4	1.117E+5
	Act (Ci)	1.121E+2	3.310E+1	6.861E+1	5.030E+2	2.444E+3	3.161E+3
A ^a	Vol (ft ³)	9.220E+3	5.648E+3	7.004E+3	6.486E+4	2.696E+4	1.137E+5
	Act (Ci)	1.132E+2	4.607E+1	7.167E+1	5.122E+2	3.508E+3	4.251E+3
B	Vol (ft ³)	6.041E+1	5.242E+1	2.119E+1	1.097E+3	2.651E+2	1.496E+3
	Act (Ci)	5.928E+1	8.630E+2	2.107E+0	3.298E+4	1.109E+2	3.401E+4
C	Vol (ft ³)	1.500E+1		1.170E+0	9.521E+2	6.040E+1	1.029E+3
	Act (Ci)	9.748E+2		5.034E-3	2.363E+3	1.079E+3	4.417E+3
Tot	Vol (ft ³)	9.295E+3	5.700E+3	7.027E+3	6.691E+4	2.729E+4	1.162E+5
	Act (Ci)	1.147E+3	9.090E+2	7.378E+1	3.585E+4	4.698E+3	4.268E+4

a. AS: Class A, stable; AU: Class A, unstable; A: Total Class A.

Table 17. Total Waste Volume and Activity Sorted by General Industry

<u>Year & Class</u>	<u>College or University</u>	<u>Government</u>	<u>Hospitals</u>	<u>Private Industry</u>	<u>Utilities</u>	<u>Total</u>
<u>1987</u>						
Vol. A	4.710E+4	1.319E+5	2.808E+4	6.673E+5	9.226E+5	1.797E+6
(ft ³) B	2.630E+1	2.406E+2	3.010E+0	1.636E+3	3.720E+4	3.911E+4
C	9.471E+1	3.675E+2	1.730E+2	5.846E+2	7.485E+3	8.705E+3
Tot	4.722E+4	1.325E+5	2.826E+4	6.696E+5	9.673E+5	1.845E+6
Act. A	1.028E+2	2.633E+2	3.469E+1	3.796E+3	2.187E+4	2.607E+4
(Ci) B	3.736E+0	6.908E+3	4.005E-3	3.720E+4	2.300E+4	6.711E+4
C	4.385E-1	1.398E+0	8.452E-1	1.476E+3	1.750E+5	1.765E+5
Tot	1.070E+2	7.173E+3	3.554E+1	4.247E+4	2.199E+5	2.697E+5
<u>1988</u>						
Vol. A	4.415E+4	8.679E+4	2.106E+4	4.640E+5	7.621E+5	1.378E+6
(ft ³) B	1.910E+1	3.844E+2	4.550E+0	1.969E+3	3.606E+4	3.843E+4
C	5.071E+1	1.599E+2		1.447E+3	1.054E+4	1.220E+4
Tot	4.422E+4	8.734E+4	2.106E+4	4.674E+5	8.087E+5	1.429E+6
Act. A	1.502E+2	3.031E+2	8.092E+1	3.799E+3	2.391E+4	2.824E+4
(Ci) B	5.747E-1	8.884E+3	4.430E-2	2.842E+4	2.302E+4	6.032E+4
C	2.107E+3	3.121E+2		2.213E+3	1.666E+5	1.712E+5
Tot	2.258E+3	9.499E+3	8.096E+1	3.443E+4	2.135E+5	2.598E+5
<u>1989</u>						
Vol. A	6.478E+4	1.130E+5	3.408E+4	5.638E+5	7.998E+5	1.575E+6
(ft ³) B	1.143E+2	6.835E+2	4.190E+1	2.296E+3	3.281E+4	3.595E+4
C	3.750E+1	1.941E+2	1.240E+0	1.670E+3	1.461E+4	1.651E+4
Tot	6.493E+4	1.138E+5	3.413E+4	5.677E+5	8.472E+5	1.628E+6
Act. A	2.986E+2	2.079E+2	1.462E+2	4.897E+3	2.309E+4	2.864E+4
(Ci) B	6.074E+2	1.203E+4	2.690E+0	1.196E+5	2.900E+4	1.612E+5
C	1.036E+3	3.192E+2	5.044E-3	2.538E+3	6.731E+5	6.770E+5
Tot	1.942E+3	1.255E+4	1.489E+2	1.270E+5	7.252E+5	8.669E+5

Table 18. Total Waste Volume and Activity Sorted by General Industry
and Disposal Facility

<u>Year & Class</u>	<u>College or University</u>	<u>Government</u>	<u>Hospitals</u>	<u>Private Industry</u>	<u>Utilities</u>	<u>Total</u>	
<u>1987</u>	<u>Vol. B^a</u>	1.091E+4	5.951E+4	9.740E+2	2.592E+5	6.252E+5	9.558E+5
	(ft ³) R	3.532E+4	1.177E+4	2.728E+4	2.122E+5	2.701E+5	5.566E+5
	Be	9.900E+2	6.125E+4		1.982E+5	7.198E+4	3.324E+5
	Tot	4.722E+4	1.325E+5	2.826E+4	6.696E+5	9.673E+5	1.845E+6
	Act. B	1.591E+1	6.086E+3	1.149E-1	3.975E+3	2.010E+5	2.111E+5
	(Ci) R	9.050E+1	1.082E+3	3.542E+1	2.903E+4	1.724E+4	4.748E+4
	Be	5.472E-1	5.293E+0		9.463E+3	1.632E+3	1.110E+4
	Tot	1.070E+2	7.173E+3	3.554E+1	4.247E+4	2.199E+5	2.697E+5
<u>1988</u>	<u>Vol. B</u>	1.122E+4	6.810E+4	7.834E+2	2.548E+5	5.970E+5	9.320E+5
	(ft ³) R	3.040E+4	1.277E+4	1.920E+4	1.603E+5	1.808E+5	4.034E+5
	Be	2.599E+3	6.467E+3	1.072E+3	5.233E+4	3.094E+4	9.341E+4
	Tot	4.422E+4	8.734E+4	2.106E+4	4.674E+5	8.087E+5	1.429E+6
	Act. B	1.597E+3	9.243E+3	1.066E-1	5.550E+3	2.026E+5	2.190E+5
	(Ci) R	1.282E+2	2.480E+2	7.585E+1	2.318E+4	8.438E+3	3.207E+4
	Be	5.322E+2	8.498E+0	5.007E+0	5.705E+3	2.441E+3	8.691E+3
	Tot	2.258E+3	9.499E+3	8.096E+1	3.443E+4	2.135E+5	2.598E+5
<u>1989</u>	<u>Vol. B</u>	1.629E+4	8.574E+4	2.069E+3	3.350E+5	6.642E+5	1.103E+6
	(ft ³) R	3.935E+4	2.239E+4	2.503E+4	1.658E+5	1.557E+5	4.083E+5
	Be	9.295E+3	5.700E+3	7.027E+3	6.691E+4	2.729E+4	1.162E+5
	Tot	6.493E+4	1.138E+5	3.413E+4	5.677E+5	8.472E+5	1.628E+6
	Act. B	6.387E+2	1.161E+4	2.587E+0	3.216E+4	6.808E+5	7.252E+5
	(Ci) R	1.564E+2	3.909E+1	7.257E+1	5.902E+4	3.977E+4	9.906E+4
	Be	1.147E+3	9.090E+2	7.378E+1	3.585E+4	4.698E+3	4.268E+4
	Tot	1.942E+3	1.255E+4	1.489E+2	1.270E+5	7.252E+5	8.669E+5

a. B: Barnwell; R: Richland; Be: Beatty.

except for 1989, most of the hospital waste activity as well. The Richland facility received most of the activity delivered by industrial generators, but not most of the volume.

Appendix B provides an isotopic distribution as a function of waste class and general industry for the two USE disposal facilities. Unfortunately, a similar distribution is not available for the Barnwell facility. If it were available, an instructive exercise would be to sum the isotopic distribution for each radionuclide and industry category and perform decay calculations. Eventually, most LLW activity will probably reside in waste delivered from industrial generators.

5. VOLUMES AND GROSS ACTIVITIES PER WASTE STREAM

This section presents the distribution of waste volume and gross activity as a function of waste stream for each of the three disposal facilities. Descriptions of the waste streams are provided in Table 19.

Waste descriptions for the Richland and Beatty facilities differ from those for the Barnwell facility. The shipment manifest for the USE facilities incorporates an index system whereby the shipper selects the description most appropriate to the waste from a short list printed on the manifest form. This list includes filter media, dewatered resin, compacted dry active waste, and so forth. Starting in 1988, this list was augmented by several waste descriptions. The CNSI manifest merely provides a space for the waste description. When the shipment manifest arrives at the Barnwell facility, CNSI staff assigns the waste to one of a short list of waste categories based on the shipper's description. These waste categories are the same for all 3 years considered in this report.

Tables 20 through 25 present data for the Barnwell facility in two ways. Tables 20, 22, and 24 present volumes and activities for each waste stream as a function of waste class. Tables 21, 23 and 25 are limited to waste volumes but provide more information about the physical form of the waste. For example, information is provided about any solidification medium used. In addition, a distinction is made between fuel cycle and non-fuel cycle waste, where fuel cycle waste consists of waste from nuclear utilities and uranium fuel fabrication plants.

Tables 26 through 31 present waste volume and activity data for the Richland facility, whereas Tables 32 through 37 present waste volume and activity data for the Beatty facility. For Tables 26 through 37, additional information about the radionuclide distributions in individual waste streams is provided in Appendix C. For waste disposed during 1989 at the Richland facility, Appendix D lists radionuclide distributions as a function of waste stream and general industry. Additional information about the use of solidification and absorbent media at the Richland and Beatty facilities is provided in Appendices E and F.

The tables indicate that activated metals consistently account for most of the activity in LLW. In 1987, activated metals comprised at least 56 percent of all LLW activity. In 1988, activated metals accounted for 58 percent of all LLW activity and only 0.1 percent of the volume. In 1989, activated metals

Table 19. Waste Descriptions Used by Disposal Facility Operators

<u>CNSI (Barnwell):</u>	Resin Solid combustibles Solid non-combustibles Filter media (used in liquids and other than resin or cartridges) Cartridge/mechanical filters (used in liquids) Solidified liquids (includes concentrates and sludge)	Equipment, components Bulk Biological Incinerator ash Other (specify) Air filtration filters Combustibles and non-combustibles (mixed)
<u>USE (1987):</u>	Dry solid Solidified liquid Biological (not animal carcasses) Filter media Dewatered resins Solidified resins Absorbed aqueous liquid Absorbed organic liquid	Scintillation (or organic) liquid in vials in absorbent Aqueous liquid in vials in absorbent Animal carcasses in absorbent Other
<u>USE (1988 on):</u>	Evaporator bottoms Compacted dry active waste Non-compacted dry active waste Cartridge-type filter media Non-cartridge filter media Activated reactor hardware Solidified resins Dry solid Solidified liquids Sorbed aqueous liquid Sorbed non-aqueous liquid	Non-aqueous liquids in vials in sorbent Aqueous liquids in vials in sorbent Solidified chelates Solidified oil Biological (non-carcass waste) Animal carcasses in lime and sorbent Gas Other

Table 20. Barnwell 1987 Waste Volume and Activity by Waste Stream and Class

<u>Waste Stream</u>	<u>Class A</u>	<u>Class B</u>	<u>Class C</u>	<u>Total</u>
<u>Volume (ft³)</u>				
Resin	1.890E+5	2.556E+4	3.993E+3	2.185E+5
Solid combustibles	1.508E+3	1.190E+2		1.627E+3
Solid noncombustibles	5.082E+4	1.869E+2	3.003E+1	5.103E+4
Filter media (a)	2.706E+4	1.375E+3	1.011E+2	2.854E+4
Cartridge/mechanical filters (b)	6.638E+3	1.806E+3	1.919E+3	1.036E+4
Solidified liquids (c)	6.168E+4	1.099E+3		6.278E+4
Equipment, components	3.849E+2	2.929E+2	9.699E+2	1.648E+3
Biological	6.515E+3			6.515E+3
Incinerator ash	3.000E+1			3.000E+1
Air filtration filters	5.844E+3			5.844E+3
Combustibles and non-combustibles (mixed)	5.680E+5	7.652E+2	7.637E+1	5.689E+5
Total	9.175E+5	3.121E+4	7.090E+3	9.558E+5
<u>Activity (Ci)</u>				
Resin	1.663E+4	1.717E+4	1.038E+4	4.418E+4
Solid combustibles	8.740E+0	1.300E+2		1.387E+2
Solid noncombustibles	3.009E+2	5.977E+3	7.216E+1	6.350E+3
Filter media (a)	3.114E+2	3.489E+2		6.603E+2
Cartridge/mechanical filters (b)	1.596E+2	4.456E+2	1.167E+3	1.785E+3
Solidified liquids (c)	8.064E+2	2.347E+2		1.029E+3
Equipment, components	3.510E+1	1.177E+3	1.516E+5	1.528E+5
Biological	1.357E+0			1.357E+0
Incinerator ash	7.000E-5			7.000E-5
Air filtration filters	5.685E+0			5.685E+0
Combustibles and non-combustibles (mixed)	1.266E+3	2.744E+3	2.204E+1	4.032E+3
Total	1.953E+4	2.822E+4	1.633E+5	2.110E+5

a. Used in liquids and other than resin or cartridges.

b. Used in liquids.

c. Includes concentrates and sludges.

Table 21. Barnwell 1987 Waste Volume (ft³) by Waste Stream and Physical Form

<u>Waste Stream</u>	<u>Physical Form</u>	<u>Fuel Cycle</u>	<u>Non Fuel Cycle</u>	<u>Total</u>	<u>Waste Total</u>
Resin	Dewatered	1.651E+5	3.979E+2	1.655E+5	2.185E+5
	Cement	5.210E+4	7.973E+2	5.290E+4	
	Delaware custom mat.		1.500E+2	1.500E+2	
Solid combustibles	Dewatered	1.190E+2		1.190E+2	1.627E+3
	Cement		3.000E+1	3.000E+1	
	Solid	5.450E+2	9.330E+2	1.478E+3	
Solid non- combustibles	Cement		3.770E+3	3.770E+3	5.103E+4
	Solid	1.216E+4	3.175E+4	4.391E+4	
	Gas		3.225E+2	3.225E+2	
	SSD&G (a)		3.032E+3	3.032E+3	
Filter media (b)	Dewatered	8.238E+3	6.310E+3	1.455E+4	2.854E+4
	Cement	3.986E+3	1.001E+4	1.399E+4	
Cartridge/mechani- cal filters (c)	Dewatered	9.650E+3		9.650E+3	1.036E+4
	Cement	7.135E+2		7.135E+2	
Solidified liquids (d)	Cement	5.443E+4	7.847E+3	6.228E+4	6.278E+4
	Asphalt	1.500E+2		1.500E+2	
	Delaware custom mat.		3.450E+2	3.450E+2	
Equipment, compo- nents	Solid	1.496E+3	1.515E+2	1.648E+3	1.648E+3
Biological	Solid		6.515E+3	6.515E+3	6.515E+3
Incinerator ash	Solid		3.000E+1	3.000E+1	3.000E+1
Air Filtration filters	Solid	1.423E+3	4.420E+3	5.844E+3	5.844E+4
Combustibles & non- combustibles (mixed)	Cement		3.381E+3	3.381E+3	5.689E+5
	Solid	4.028E+5	1.627E+5	5.655E+5	
	SSD&G		6.420E+0	6.420E+0	
Total		7.129E+5	2.429E+5	9.558E+5	9.558E+5

a. Sealed sources, devices, and gauges.

b. Used in liquids and other than resin.

c. Used in liquids.

d. Includes concentrates and sludges.

Table 22. Barnwell 1988 Waste Volume and Activity by Waste Stream and Class

<u>Waste Stream</u>	<u>Class A</u>	<u>Class B</u>	<u>Class C</u>	<u>Total</u>
<u>Volume (ft³)</u>				
Resin	1.883E+5	2.681E+4	4.751E+3	2.199E+5
Solid combustibles	4.680E+2			4.680E+2
Solid noncombustibles	4.893E+4	6.628E+2	8.124E+2	5.041E+4
Filter media (a)	1.403E+4	1.146E+3	1.460E+2	1.533E+4
Cartridge/mechanical filters (b)	7.968E+3	1.631E+3	2.225E+3	1.182E+4
Solidified liquids (c)	4.253E+4	1.222E+3	2.873E+2	4.404E+4
Equipment, components	6.468E+2	1.922E+2	5.722E+2	1.411E+3
Biological	3.944E+3			3.944E+3
Incinerator ash	5.130E+2			5.130E+2
Air filtration filters	3.911E+3			3.911E+3
Combustibles and non-combustibles (mixed)	5.776E+5	1.838E+3	7.770E+2	5.802E+5
<u>Total</u>	<u>8.889E+5</u>	<u>3.350E+4</u>	<u>9.570E+3</u>	<u>9.320E+5</u>
<u>Activity (Ci)</u>				
Resin	1.822E+4	1.684E+4	1.167E+4	4.673E+4
Solid combustibles	1.502E-1			1.502E-1
Solid noncombustibles	2.542E+2	8.882E+3	4.787E+2	9.615E+3
Filter media (a)	2.107E+2	1.838E+2	1.380E+3	1.774E+3
Cartridge/mechanical filters (b)	6.320E+2	6.590E+2	1.967E+3	3.258E+3
Solidified liquids (c)	3.479E+2	6.831E+2	1.215E+1	1.043E+3
Equipment, components	1.305E+0	2.326E+3	1.485E+5	1.508E+5
Biological	7.585E-1			7.585E-1
Incinerator ash				
Air filtration filters	1.501E+1			1.501E+1
Combustibles and non-combustibles (mixed)	1.565E+3	4.033E+3	3.010E+1	5.629E+3
<u>Total</u>	<u>2.124E+4</u>	<u>3.361E+4</u>	<u>1.640E+5</u>	<u>2.189E+5</u>

a. Used in liquids and other than resin or cartridges.

b. Used in liquids.

c. Includes concentrates and sludges.

Table 23. Barnwell 1988 Waste Volume (ft³) by Waste Stream and Physical Form

<u>Waste Stream</u>	<u>Physical Form</u>	<u>Fuel Cycle</u>	<u>Non Fuel Cycle</u>	<u>Total</u>	<u>Waste Total</u>
Resin	Dewatered	1.704E+5	8.784E+2	1.713E+5	2.199E+5
	Cement	4.754E+4	1.095E+3	4.863E+4	
Solid combustibles	Solid		4.680E+2	4.680E+2	4.680E+2
Solid non-combustibles	Cement	6.986E+2	3.407E+3	4.105E+3	5.041E+4
	Solid	1.774E+4	2.475E+4	4.249E+4	
	Gas		6.982E+2	6.982E+2	
	SSD&G (a)	5.732E+2	2.541E+3	3.114E+3	
Filter media (b)	Dewatered	6.077E+3	5.120E+3	1.120E+4	1.533E+4
	Cement	2.159E+3	1.955E+3	4.114E+3	
	Delaware custom mat.	1.560E+1		1.560E+1	
Cartridge/mechanical filters (c)	Dewatered	1.026E+4	1.852E+2	1.045E+4	1.182E+4
	Cement	1.344E+3	3.100E+2	1.375E+3	
Solidified liquids (d)	Cement	3.831E+4	5.274E+3	4.358E+4	4.404E+4
	Asphalt	1.575E+2		1.575E+2	
	Delaware custom mat.		3.000E+2	3.000E+2	
Equipment, components	Solid	1.013E+3	3.986E+2	1.411E+3	1.411E+3
Biological	Solid		3.944E+3	3.944E+3	3.944E+3
Incinerator ash	Solid	5.130E+2		5.130E+2	5.130E+2
Air Filtration filters	Solid	2.337E+3	1.573E+3	3.911E+3	3.911E+3
Combustibles & non-combustibles (mixed)	Cement	7.950E+1	8.200E+0	8.770E+1	5.802E+5
	Solid	4.044E+5	1.757E+5	5.801E+5	
	Gas	6.450E+1		6.450E+1	
Total		7.036E+5	2.283E+5	9.320E+5	9.320E+5

a. Sealed sources, devices, and gauges.

b. Used in liquids and other than resin.

c. Used in liquids.

d. Includes concentrates and sludges.

Table 24. Barnwell 1989 Waste Volume and Activity by Waste Stream and Class

<u>Waste Stream</u>	<u>Class A</u>	<u>Class B</u>	<u>Class C</u>	<u>Total</u>
<u>Volume (ft³)</u>				
Resin	1.676E+5	2.385E+4	5.649E+3	1.971E+5
Solid combustibles	1.004E+3			1.004E+3
Solid noncombustibles	1.092E+5	7.458E+2	2.538E+2	1.102E+5
Filter media (a)	2.137E+4	8.035E+2	8.820E+1	2.226E+4
Cartridge/mechanical filters (b)	4.404E+3	1.483E+3	2.646E+3	8.533E+3
Solidified liquids (c)	3.521E+4	2.356E+3	5.944E+2	3.816E+4
Equipment, components	2.419E+3	1.460E+1	2.357E+3	4.791E+3
Biological	7.471E+3			7.471E+3
Other		2.800E+1		2.800E+1
Air filtration filters	1.795E+4		1.149E+2	1.807E+4
Combustibles and non-combustibles (mixed)	6.943E+5	8.647E+2	5.353E+2	6.957E+5
Total	1.061E+6	3.015E+4	1.224E+4	1.103E+6
<u>Activity (Ci)</u>				
Resin	1.307E+4	2.386E+4	1.585E+4	5.278E+4
Solid combustibles	5.777E+0			5.777E+0
Solid noncombustibles	3.231E+2	3.726E+4	3.384E+2	3.792E+4
Filter media (a)	1.050E+3	2.145E+2	5.427E+1	1.318E+3
Cartridge/mechanical filters (b)	4.153E+2	4.364E+2	1.844E+3	2.696E+3
Solidified liquids (c)	5.296E+2	5.519E+2	4.324E+3	5.405E+3
Equipment, components	5.747E+2	8.214E+1	6.173E+5	6.180E+5
Biological	1.276E+1			1.276E+1
Other		4.622E+2		4.622E+2
Air filtration filters	1.831E+1		1.190E+1	3.021E+1
Combustibles and non-combustibles (mixed)	1.883E+3	4.549E+3	9.712E+1	6.529E+3
Total	1.788E+4	6.742E+4	6.399E+5	7.252E+5

a. Used in liquids and other than resin or cartridges.

b. Used in liquids.

c. Includes concentrates and sludges.

Table 25. Barnwell 1989 Waste Volume (ft³) by Waste Stream and Physical Form

<u>Waste Stream</u>	<u>Physical Form</u>	<u>Fuel Cycle</u>	<u>Non Fuel Cycle</u>	<u>Total</u>	<u>Waste Total</u>
Resin	Dewatered	1.725E+5	8.588E+2	1.734E+5	1.971E+5
	Cement	2.196E+4	8.287E+2	2.278E+4	
	Asphalt	9.075E+2		9.075E+2	
Solid combustibles	Dewatered		1.807E+2	1.807E+2	1.004E+3
	Cement	1.620E+2	1.575E+2	3.195E+2	
	Solid	3.070E+1	4.726E+2	5.033E+2	
Solid non-combustibles	Dewatered	3.750E+1	1.820E+2	2.195E+2	1.102E+5
	Cement	3.301E+2	5.411E+3	5.741E+3	
	Solid	4.125E+4	5.999E+4	1.012E+5	
	Gas		4.620E+0	4.620E+0	
	SSD&G (a)	1.147E+2	2.843E+3	2.957E+3	
Filter media (b)	Dewatered	6.964E+3	6.735E+3	1.370E+4	2.226E+4
	Cement	2.627E+3	5.181E+3	7.809E+3	
	Dow media	3.750E+1		3.750E+1	
	Asphalt	7.200E+2		7.200E+2	
Cartridge/mechanical filters (c)	Dewatered	7.697E+3	4.259E+2	8.123E+3	8.533E+3
	Cement	1.006E+2	3.092E+2	4.098E+2	
Solidified liquids (d)	Dewatered	1.590E+1		1.590E+1	3.816E+4
	Cement	2.805E+4	9.326E+3	3.737E+4	
	Dow media	6.750E+1		6.750E+1	
	Asphalt	4.725E+2		4.725E+2	
	Solid		2.280E+2	2.280E+2	
Equipment, components	Cement	3.830E+1	7.500E+0	4.580E+1	4.791E+3
	Solid	4.346E+3	3.986E+2	4.745E+3	
Biological	Solid	8.250E+1	7.389E+3	7.471E+3	7.471E+3
Other	Gas		2.800E+1	2.800E+1	2.800E+1
Air Filtration filters	Cement	8.270E+1	2.120E+2	2.947E+2	1.807E+4
	Solid	9.939E+3	7.832E+3	1.777E+4	
Combustibles & non-combustibles (mixed)	Cement	2.146E+2	1.500E+1	2.296E+2	6.957E+5
	Solid	4.547E+5	2.403E+5	6.949E+5	
	Gas	2.040E+2		2.040E+2	
	SSD&G		3.625E+2	3.625E+2	
Total		7.536E+5	3.497E+5	1.103E+6	1.103E+6

- a. Sealed sources, devices, and gauges.
- b. Used in liquids and other than resin.
- c. Used in liquids.
- d. Includes concentrates and sludges.

Table 26. Richland 1987 Waste Volume (ft³) by Waste Stream and Class

<u>Waste Description</u>	<u>Class AS^a</u>	<u>Class AU^a</u>	<u>Class A^a</u>	<u>Class B</u>	<u>Class C</u>	<u>Total</u>
Animal Carcasses in Lime & Sorbent		1.203E+4	1.203E+4			1.203E+4
Aqueous Liquids in Vials in Sorbent		4.700E+3	4.700E+3			4.700E+3
Biological (Non-Carcass waste)		2.813E+2	2.813E+2			2.813E+2
Compacted Dry Active Waste		5.700E+2	5.700E+2			5.700E+2
Dewatered Resins	1.308E+2	3.544E+4	3.557E+4	2.810E+3	1.320E+2	3.851E+4
Dry Solid	8.524E+1	4.177E+5	4.178E+5	1.006E+3	1.407E+3	4.202E+5
Filter Media	1.121E+3	1.197E+3	2.317E+3	1.148E+3		3.465E+3
Non-Compacted Dry Active Waste		2.075E+2	2.075E+2			2.075E+2
Other	7.000E-1	7.656E+3	7.657E+3			7.657E+3
Solidified Liquids	1.062E+4	1.645E+4	2.707E+4	1.725E+2	4.500E+1	2.729E+4
Solidified Resins	9.530E+2	4.143E+3	5.096E+3	2.089E+3		7.184E+3
Sorbed Aqueous Liquids		2.967E+4	2.967E+4			2.967E+4
Sorbed Non-Aqueous Liquids		4.857E+3	4.857E+3			4.857E+3
Vials		1.500E+1	1.500E+1			1.500E+1
	1.291E+4	5.349E+5	5.478E+5	7.225E+3	1.584E+3	5.566E+5

a. AS: Class A, stable; AU: Class A, unstable; A: total Class A.

Table 27. Richland 1987 Waste Activity (Ci) by Waste Stream and Class

<u>Waste Description</u>	<u>Class AS^a</u>	<u>Class AU^a</u>	<u>Class A^a</u>	<u>Class B</u>	<u>Class C</u>	<u>Total</u>
Animal Carcasses in Lime & Sorbent		1.527E+1	1.527E+1			1.527E+1
Aqueous Liquids in Vials in Sorbent		9.921E+0	9.921E+0			9.921E+0
Biological (Non-Carcass waste)		2.606E-2	2.606E-2			2.606E-2
Compacted Dry Active Waste		6.264E-1	6.264E-1			6.264E-1
Dewatered Resins	8.616E+1	1.292E+3	1.378E+3	2.241E+3	3.829E+2	4.002E+3
Dry Solid	5.764E+0	1.580E+3	1.586E+3	5.852E+3	1.183E+4	1.927E+4
Filter Media	4.861E+1	1.218E+1	6.079E+1	2.847E+2		3.455E+2
Non-Compacted Dry Active Waste		6.478E+0	6.478E+0			6.478E+0
Other	2.000E-2	5.279E+0	5.299E+0			5.299E+0
Solidified Liquids	1.243E+1	7.951E+2	8.075E+2	2.118E+4	8.568E+2	2.284E+4
Solidified Resins	5.091E+1	2.318E+1	7.409E+1	6.740E+2		7.481E+2
Sorbed Aqueous Liquids		2.412E+2	2.412E+2			2.412E+2
Sorbed Non-Aqueous Liquids		1.764E+0	1.764E+0			1.764E+0
Vials		<u>1.187E-2</u>	<u>1.187E-2</u>			<u>1.187E-2</u>
	2.039E+2	3.983E+3	4.187E+3	3.023E+4	1.307E+4	4.748E+4

a. AS: Class A, stable; AU: Class A, unstable; A: total Class A.

Table 28. Richland 1988 Waste Volume (ft³) by Waste Stream and Class

Waste Description	Class AS ^a	Class AU ^a	Class A ^a	Class B	Class C	Total
Activated Reactor Hardware	1.399E+2	1.413E+2	2.812E+2			2.812E+2
Animal Carcasses in Lime & Sorbent		1.152E+4	1.152E+4			1.152E+4
Aqueous Liquids in Vials in Sorbent		5.051E+3	5.051E+3			5.051E+3
Biological (Non-Carcass waste)		1.183E+3	1.183E+3			1.183E+3
Cartridge-Type Filter Media	4.678E+2	8.786E+2	1.346E+3	3.049E+2	2.548E+2	1.906E+3
Compacted Dry Active Waste	8.800E+1	8.483E+4	8.492E+4		1.760E+2	8.509E+4
Dewatered Resins	5.234E+2	2.973E+4	3.026E+4	2.349E+3	1.355E+3	3.396E+4
Dry Solid	8.700E+0	1.567E+5	1.567E+5	4.773E+2	1.943E+2	1.574E+5
Evaporator Bottoms		1.584E+4	1.584E+4			1.584E+4
Gas		1.875E+2	1.875E+2			1.875E+2
Non-Aqueous Liquids in Vials in Sorbent		7.500E+0	7.500E+0			7.500E+0
Non-Cartridge Filter Media		2.041E+3	2.041E+3			2.041E+3
Non-Compacted Dry Active Waste		2.570E+4	2.570E+4	6.449E+2	4.000E+2	2.674E+4
Other	4.000E+0	1.439E+3	1.443E+3	7.500E+0	2.250E+1	1.473E+3
Solidified Chelates		4.920E+3	4.920E+3			4.920E+3
Solidified Liquids	4.100E+0	7.154E+3	7.158E+3	1.725E+2		7.330E+3
Solidified Oil	2.181E+3	5.919E+3	8.100E+3			8.100E+3
Solidified Resins	5.317E+2	7.512E+3	8.044E+3	2.890E+2		8.333E+3
Sorbed Aqueous Liquids		3.079E+4	3.079E+4			3.079E+4
Sorbed Non-Aqueous Liquids		1.278E+3	1.278E+3			1.278E+3
	3.949E+3	3.928E+5	3.968E+5	4.245E+3	2.403E+3	4.034E+5

a. AS: Class A, stable; AU: Class A, unstable; A: total Class A.

Table 29. Richland 1988 Waste Activity (Ci) by Waste Stream and Class

<u>Waste Description</u>	<u>Class AS^a</u>	<u>Class AU^a</u>	<u>Class A^a</u>	<u>Class B</u>	<u>Class C</u>	<u>Total</u>
Activated Reactor Hardware	5.189E-1	7.469E+0	7.988E+0			7.988E+0
Animal Carcasses in Lime & Sorbent		4.251E+1	4.251E+1			4.251E+1
Aqueous Liquids in Vials in Sorbent		1.120E+1	1.120E+1			1.120E+1
Biological (Non-Carcass waste)		6.872E+0	6.872E+0			6.872E+0
Cartridge-Type Filter Media	8.777E+1	1.085E+2	1.963E+2	3.085E+2	1.556E+2	6.603E+2
Compacted Dry Active Waste	2.955E-2	2.198E+2	2.198E+2		4.731E+0	2.246E+2
Dewatered Resins	2.125E+2	9.464E+2	1.159E+3	1.303E+3	4.297E+3	6.758E+3
Dry Solid	5.914E-1	1.783E+3	1.784E+3	3.772E+3	1.547E+2	5.711E+3
Evaporator Bottoms		4.233E+1	4.233E+1			4.233E+1
Gas		6.310E-2	6.310E-2			6.310E-2
Non-Aqueous Liquids in Vials in Sorbent		1.518E-2	1.518E-2			1.518E-2
Non-Cartridge Filter Media		3.200E+1	3.200E+1			3.200E+1
Non-Compacted Dry Active Waste		7.036E+1	7.036E+1	1.154E+2	1.551E+1	2.013E+2
Other	4.880E-4	9.813E+0	9.813E+0	9.634E-1	1.464E-1	1.092E+1
Solidified Chelates		5.350E-1	5.350E-1			5.350E-1
Solidified Liquids	4.530E-4	3.248E+2	3.248E+2	1.732E+4		1.764E+4
Solidified Oil	6.373E-1	2.096E+0	2.733E+0			2.733E+0
Solidified Resins	2.194E+2	4.640E+1	2.658E+2	1.755E+2		4.413E+2
Sorbed Aqueous Liquids		2.739E+2	2.739E+2			2.793E+2
Sorbed Non-Aqueous Liquids		2.447E-1	2.447E-1			2.447E-1
	5.215E+2	3.928E+3	4.450E+3	2.299E+4	4.628E+3	3.207E+4

a. AS: Class A, stable; AU: Class A, unstable; A: total Class A.

Table 30. Richland 1989 Waste Volume (ft³) by Waste Stream and Class

Waste Description	Class AS ^a	Class AU ^a	Class A ^a	Class B	Class C	Total
Activated Reactor Hardware		9.200E+1	9.200E+1		2.620E+1	1.182E+2
Animal Carcasses in Lime & Sorbent		1.397E+4	1.397E+4			1.397E+4
Aqueous Liquids in Vials in Sorbent		4.440E+3	4.440E+3			4.440E+3
Biological (Non-Carcass waste)		1.907E+3	1.907E+3			1.907E+3
Cartridge-Type Filter Media		1.461E+3	1.461E+3	9.980E+1	7.699E+2	2.330E+3
Compacted Dry Active Waste		7.752E+4	7.752E+4		1.308E+2	7.765E+4
Dewatered Resins		2.772E+4	2.772E+4	3.134E+3	1.120E+3	3.198E+4
Dry Solid	2.318E+1	1.506E+5	1.507E+5	2.460E+2	1.133E+3	1.520E+5
Evaporator Bottoms		1.618E+4	1.618E+4			1.618E+4
Gas		3.675E+2	3.675E+2			3.675E+2
Non-Aqueous Liquids in Vials in Sorbent		1.151E+1	1.151E+1			1.151E+1
Non-Cartridge Filter Media		3.336E+3	3.336E+3	1.820E+2		3.518E+3
Non-Compacted Dry Active Waste		3.089E+4	3.089E+4		5.134E+1	3.094E+4
Other		1.507E+2	1.507E+2			1.507E+2
Solidified Chelates		3.088E+3	3.088E+3			3.088E+3
Solidified Liquids		7.393E+3	7.393E+3	1.500E+1	1.500E+1	7.423E+3
Solidified Oil	2.074E+2	1.010E+3	1.031E+4			1.031E+4
Solidified Resins		3.426E+3	3.426E+3	6.291E+2		4.055E+3
Sorbed Aqueous Liquids		4.734E+4	4.734E+4			4.734E+4
Sorbed Non-Aqueous Liquids	1.308E+2	3.490E+2	4.798E+2			4.798E+2
	3.614E+2	4.004E+5	4.007E+5	4.306E+3	3.247E+3	4.083E+5

a. AS: Class A, stable; AU: Class A, unstable; A: total Class A.

Table 31. Richland 1989 Waste Activity (Ci) by Waste Stream and Class

<u>Waste Description</u>	<u>Class AS^a</u>	<u>Class AU^a</u>	<u>Class A^a</u>	<u>Class B</u>	<u>Class C</u>	<u>Total</u>
Activated Reactor Hardware		3.911E-1	3.911E-1		2.221E+4	2.221E+4
Animal Carcasses in Lime & Sorbent		3.703E+1	3.703E+1			3.703E+1
Aqueous Liquids in Vials in Sorbent		2.106E+1	2.106E+1			2.106E+1
Biological (Non-Carcass waste)		2.293E+0	2.293E+0			2.293E+0
Cartridge-Type Filter Media		4.949E+1	4.949E+1	1.062E+2	1.795E+2	3.352E+2
Compacted Dry Active Waste		2.532E+2	2.532E+2		1.068E+3	1.321E+3
Dewatered Resins		9.185E+2	9.185E+2	3.064E+3	8.979E+3	1.296E+4
Dry Solid	9.786E-3	2.285E+3	2.285E+3	5.439E+4	2.877E+2	5.696E+4
Evaporator Bottoms		4.986E+1	4.986E+1			4.986E+1
Gas		1.503E-1	1.503E-1			1.503E-1
Non-Aqueous Liquids in Vials in Sorbent		3.020E-3	3.020E-3			3.020E-3
Non-Cartridge Filter Media		1.479E+3	1.479E+3	2.178E+1		1.502E+3
Non-Compacted Dry Active Waste		2.828E+1	2.828E+1		2.467E+1	5.295E+1
Other		6.354E+1	6.354E+1			6.354E+1
Solidified Chelates		4.423E+1	4.423E+1			4.423E+1
Solidified Liquids		8.422E+2	8.422E+2	1.550E+3	1.953E+0	2.394E+3
Solidified Oil	2.000E-6	4.770E+0	4.770E+0			4.770E+0
Solidified Resins		9.523E+0	9.523E+0	6.699E+2		6.795E+2
Sorbed Aqueous Liquids		4.130E+2	4.130E+2			4.130E+2
Sorbed Non-Aqueous Liquids	8.348E-1	1.817E-2	8.530E-1			8.530E-1
	8.446E-1	6.502E+3	6.503E+3	5.980E+4	3.276E+4	9.906E+4

a. AS: Class A, stable; AU: Class A, unstable; A: total Class A.

Table 32. Beatty 1987 Waste Volume (ft³) by Waste Stream and Class

<u>Waste Description</u>	<u>Class AS^a</u>	<u>Class AU^a</u>	<u>Class A^a</u>	<u>Class B</u>	<u>Class C</u>	<u>Total</u>
Animal Carcasses in Lime & Sorbent		1.602E+3	1.602E+3			1.602E+3
Aqueous Liquids in Vials in Sorbent		2.250E+1	2.250E+1			2.250E+1
Biological (Non-Carcass waste)		1.828E+2	1.828E+2			1.828E+2
Compacted Dry Active Waste		5.431E+2	5.431E+2			5.431E+2
Dewatered Resins		2.354E+3	2.354E+3			2.354E+3
Dry Solid	4.436E+2	2.818E+5	2.823E+5	2.876E+2	3.122E+1	2.826E+5
Filter Media	4.990E+1	8.250E+1	1.324E+2	4.990E+1		1.823E+2
Gas		2.250E+1	2.250E+1			2.250E+1
Other		6.876E+2	6.876E+2			6.876E+2
Solidified Liquids	1.325E+4	2.253E+4	3.578E+4			3.578E+4
Solidified Resins	9.845E+2	6.052E+3	7.036E+3	3.395E+2		7.376E+3
Sorbed Aqueous Liquids		9.721E+2	9.721E+2			9.721E+2
Vials		1.158E+2	1.158E+2			1.158E+2
	1.472E+4	3.170E+5	3.317E+5	6.770E+2	3.122E+1	3.324E+5

a. AS: Class A, stable; AU: Class A, unstable; A: total Class A.

Table 33. Beatty 1987 Waste Activity (Ci) by Waste Stream and Class

<u>Waste Description</u>	<u>Class AS^a</u>	<u>Class AU^a</u>	<u>Class A^a</u>	<u>Class B</u>	<u>Class C</u>	<u>Total</u>
Animal Carcasses in Lime & Sorbent		7.931E-1	7.931E-1			7.931E-1
Aqueous Liquids in Vials in Sorbent		6.011E-3	6.011E-3			6.011E-3
Biological (Non-Carcass waste)		5.859E-3	5.859E-3			5.859E-3
Compacted Dry Active Waste		2.013E+0	2.013E+0			2.013E+0
Dewatered Resins		8.871E-1	8.871E-1			8.871E-1
Dry Solid	4.151E+0	1.029E+3	1.033E+3	8.390E+3	1.564E+2	9.580E+3
Filter Media	1.533E+0	6.813E-1	2.214E+0	4.435E+0		6.649E+0
Gas		4.051E-3	4.051E-3			4.051E-3
Other		1.239E+0	1.239E+0			1.239E+0
Solidified Liquids	7.681E+0	5.952E+2	6.029E+2			6.029E+2
Solidified Resins	2.704E+2	4.369E+2	7.072E+2	1.954E+2		9.026E+2
Sorbed Aqueous Liquids		1.743E+0	1.743E+0			1.743E+0
Vials		2.352E+0	2.352E+0			2.352E+0
	2.837E+2	2.071E+3	2.355E+3	8.590E+3	1.564E+2	1.110E+4

a. AS: Class A, stable; AU: Class A, unstable; A: total Class A.

Table 34. Beatty 1988 Waste Volume (ft³) by Waste Stream and Class

<u>Waste Description</u>	<u>Class AS^a</u>	<u>Class AU^a</u>	<u>Class A^a</u>	<u>Class B</u>	<u>Class C</u>	<u>Total</u>
Animal Carcasses in Lime & Sorbent		9.080E+2	9.080E+2			9.080E+2
Aqueous Liquids in Vials in Sorbent		6.000E+1	6.000E+1			6.000E+1
Biological (Non-Carcass waste)		7.500E+1	7.500E+1			7.500E+1
Cartridge-Type Filter Media		1.125E+2	1.125E+2			1.125E+2
Compacted Dry Active Waste	3.000E+1	3.733E+4	3.736E+4		1.150E+1	3.737E+4
Dewatered Resins		1.514E+3	1.514E+3			1.514E+3
Dry Solid	2.365E+2	2.290E+4	2.314E+4	4.041E+2	2.086E+2	2.375E+4
Evaporator Bottoms		9.528E+3	9.528E+3			9.528E+3
Gas		2.183E+1	2.183E+1	8.302E+1		1.049E+2
Non-Cartridge Filter Media	4.173E+2	3.682E+2	7.855E+2			7.855E+2
Non-Compacted Dry Active Waste		7.448E+3	7.448E+3	1.500E+1		7.463E+3
Other		8.020E+1	8.020E+1	4.000E+0		8.420E+1
Solidified Liquids	2.061E+2	1.362E+3	1.568E+3		7.500E+0	1.575E+3
Solidified Oil		6.809E+3	6.809E+3			6.809E+3
Solidified Resins	7.076E+2	1.051E+3	1.758E+3	1.820E+2		1.940E+3
Sorbed Aqueous Liquids		1.162E+3	1.162E+3			1.162E+3
Sorbed Non-Aqueous Liquids		1.725E+2	1.725E+2			1.725E+2
	1.598E+3	9.090E+4	9.250E+4	6.881E+2	2.276E+2	9.341E+4

a. AS: Class A, stable; AU: Class A, unstable; A: total Class A.

Table 35. Beatty 1988 Waste Activity (Ci) by Waste Stream and Class

<u>Waste Description</u>	<u>Class AS^a</u>	<u>Class AU^a</u>	<u>Class A^a</u>	<u>Class B</u>	<u>Class C</u>	<u>Total</u>
Animal Carcasses in Lime & Sorbent		3.187E-1	3.187E-1			3.187E-1
Aqueous Liquids in Vials in Sorbent		7.826E-2	7.826E-2			7.826E-2
Biological (Non-Carcass waste)		4.580E+0	4.580E+0			4.580E+0
Cartridge-Type Filter Media		1.573E-1	1.573E-1			1.573E-1
Compacted Dry Active Waste	5.670E-1	1.210E+2	1.216E+2		2.295E+2	3.511E+2
Dewatered Resins		1.487E+1	1.487E+1			1.487E+1
Dry Solid	2.428E+0	7.987E+1	8.230E+1	2.264E+3	2.322E+3	4.668E+3
Evaporator Bottoms		8.309E+2	8.309E+2			8.309E+2
Gas		6.523E+1	6.523E+1	1.149E+3		1.214E+3
Non-Cartridge Filter Media	3.856E+2	8.941E+1	4.750E+2			4.750E+2
Non-Compacted Dry Active Waste		8.856E+0	8.856E+0	1.375E+0		1.023E+1
Other		1.253E+1	1.253E+1	8.000E-2		1.261E+1
Solidified Liquids	6.322E-2	1.737E+2	1.738E+2		1.650E+0	1.754E+2
Solidified Oil		1.709E+0	1.709E+0			1.709E+0
Solidified Resins	6.364E+2	1.182E+2	7.546E+2	1.753E+2		9.299E+2
Sorbed Aqueous Liquids		1.989E+0	1.989E+0			1.989E+0
Sorbed Non-Aqueous Liquids		1.797E-1	1.797E-1			1.797E-1
	1.025E+3	1.524E+3	2.549E+3	3.590E+3	2.553E+3	8.691E+3

a. AS: Class A, stable; AU: Class A, unstable; A: total Class A.

Table 36. Beatty 1989 Waste Volume (ft³) by Waste Stream and Class

<u>Waste Description</u>	<u>Class AS^a</u>	<u>Class AU^a</u>	<u>Class A^a</u>	<u>Class B</u>	<u>Class C</u>	<u>Total</u>
Activated Reactor Hardware					6.040E+1	6.040E+1
Animal Carcasses in Lime & Sorbent		2.442E+3	2.442E+3			2.442E+3
Aqueous Liquids in Vials in Sorbent		3.000E+1	3.000E+1			3.000E+1
Biological (Non-Carcass waste)		1.050E+2	1.050E+2			1.050E+2
Cartridge-Type Filter Media		1.031E+3	1.031E+3			1.031E+3
Compacted Dry Active Waste	2.660E+1	2.837E+4	2.840E+4			2.840E+4
Dewatered Resins		1.547E+2	1.547E+2			1.547E+2
Dry Solid	4.301E+2	5.170E+4	5.213E+4	1.286E+3	9.233E+2	5.434E+4
Evaporator Bottoms		7.273E+3	7.273E+3			7.273E+3
Gas		2.171E+1	2.171E+1			2.171E+1
Non-Aqueous Liquids in Vials in Sorbent		4.010E+0	4.010E+0			4.010E+0
Non-Cartridge Filter Media	1.391E+3	2.087E+3	3.478E+3			3.478E+3
Non-Compacted Dry Active Waste	7.500E+0	9.089E+3	9.096E+3	2.250E+1		9.119E+3
Other		2.102E+2	2.102E+2			2.102E+2
Solidified Liquids	1.508E+2	5.555E+2	7.063E+2	3.750E+1	4.500E+1	7.888E+2
Solidified Oil		5.415E+3	5.415E+3			5.415E+3
Solidified Resins	1.910E+1	8.385E+2	8.576E+2	1.500E+2		1.008E+3
Sorbed Aqueous Liquids		2.346E+3	2.346E+3			2.346E+3
	2.025E+3	1.117E+5	1.137E+5	1.496E+3	1.029E+3	1.162E+5

a. AS: Class A, stable; AU: Class A, unstable; A: total Class A.

Table 37. Beatty 1989 Waste Activity (Ci) by Waste Stream and Class

<u>Waste Description</u>	<u>Class AS^a</u>	<u>Class AU^a</u>	<u>Class A^a</u>	<u>Class B</u>	<u>Class C</u>	<u>Total</u>
Activated Reactor Hardware					1.079E+3	1.079E+3
Animal Carcasses in Lime & Sorbent		1.813E+0	1.813E+0			1.813E+0
Aqueous Liquids in Vials in Sorbent		1.233E-1	1.233E-1			1.233E-1
Biological (Non-Carcass waste)		3.270E-1	3.270E-1			3.270E-1
Cartridge-Type Filter Media		4.454E+1	4.454E+1			4.454E+1
Compacted Dry Active Waste	5.724E+0	3.353E+2	3.410E+2			3.410E+2
Dewatered Resins		7.475E+1	7.475E+1			7.475E+1
Dry Solid	7.098E+0	3.667E+2	3.738E+2	3.342E+4	2.832E+3	3.663E+4
Evaporator Bottoms		1.042E+3	1.042E+3			1.042E+3
Gas		2.866E+0	2.866E+0			2.866E+0
Non-Aqueous Liquids in Vials in Sorbent		2.620E-4	2.620E-4			2.620E-4
Non-Cartridge Filter Media	1.064E+3	1.005E+3	2.068E+3			2.068E+3
Non-Compacted Dry Active Waste	2.000E-1	8.776E+0	8.976E+0	3.973E+0		1.295E+1
Other		1.047E+1	1.047E+1			1.047E+1
Solidified Liquids	1.328E+1	3.572E+0	1.686E+1	4.890E+2	5.059E+2	1.012E+3
Solidified Oil		2.156E+0	2.156E+0			2.156E+0
Solidified Resins	9.711E-3	2.605E+2	2.606E+2	9.793E+1		3.585E+2
Sorbed Aqueous Liquids		2.751E+0	2.751E+0			2.751E+0
	1.090E+3	3.161E+3	4.251E+3	3.401E+4	4.417E+3	4.268E+4

a. AS: Class A, stable; AU: Class A, unstable; A: total Class A.

accounted for 74 percent of all LLW activity and only 0.3 percent of the volume. Most of this activity consists of short-lived radionuclides such as Co-60 or Fe-55. (For 1987, activated metal information is readily available only for the Barnwell facility. During this year, "equipment and components" comprised 72 percent of the activity delivered to Barnwell and only 0.2 percent of the volume. Activated metals were not specifically identified on USE's 1987 manifests, although in its computer system USE tracked the activity of Ni-63 in activated metals. This activity totaled only 167.6 curies, all delivered in Class C waste to Richland.)

The tables also indicate that wastes accounting for much of the volume and activity are described in only general terms. For such wastes, it is more difficult to estimate the propensity for release of radioactivity to the environment through mechanisms such as leaching by water. During 1987, for example, 75 percent of the waste volume and 41 percent of the waste activity delivered to the Richland facility was described as a "dry solid." During this year, 85 percent of the volume delivered to Beatty waste was described as a dry solid, as was 86 percent of the activity. During 1989, 37 percent of the volume and 58 percent of the activity delivered to Richland was described as a dry solid, as was 47 percent of the volume and 86 percent of the activity delivered to Beatty.

6. RADIONUCLIDES IN LLW IN SIGNIFICANT QUANTITIES

Tables 38 through 40 list, in terms of activity, the most significant radionuclides in LLW, which for these tables is assumed to be those radionuclides in quantities of at least 100 curies. The tables represent the total activity disposed in all three disposal facilities. Depending on the year, the listed radionuclides represent from 99.6 to 99.9 percent of all LLW activity.

Each year, most of the activity in LLW is contributed by only a handful of radionuclides. Cobalt-60 and Fe-55 accounted for 55 to 76 percent of all activity. These two radionuclides, plus tritium and Mn-54, accounted for 77 to 90 percent of all LLW activity. Eight radionuclides consistently accounted for over 90 percent of the activity: Co-58, Co-60, Cs-137, Fe-55, H-3, Mn-54, Ni-63, and Zn-65. In fact, these radionuclides contributed 95 percent of the activity in 1987, 91 percent in 1988, and 97 percent in 1989.

7. DISTRIBUTION OF LONG-LIVED RADIONUCLIDES

Tables 41 through 43 present, by year, the distribution of long-lived radionuclides over the three Part 61 waste classes, where a long-lived radionuclide is taken to be one having a half-life of about 100 years.

The concept of a long-lived radionuclide may vary depending upon the context in which a radionuclide is considered. For example, one might use one definition for "long-lived" if one were storing waste from a medical diagnostic procedure for decay pending disposal as ordinary trash. One might use another definition if one were considering decay of LLW after it had been delivered to a disposal facility.

Table 38. 1987 Radionuclides in Quantities Exceeding 100 Curies

Nuclide	Half-Life (Years)	Activity (Ci)				Total
		Class A	Class B	Class C		
C-14	5.73E+3	1.603E+2	1.175E+1	6.372E+1	2.357E+2	
Ce-144	7.80E-1	1.914E+1	4.438E+2	4.859E+0	4.678E+2	
Co-58	1.94E-1	1.048E+3	2.878E+3	4.788E+3	8.714E+3	
Co-60	5.27E+0	4.572E+3	6.926E+3	6.658E+4	7.808E+4	
Cr-51	7.59E-2	2.761E+3	1.307E+3	9.655E+1	4.165E+3	
Cs-134	2.06E+0	2.914E+2	1.692E+3	1.548E+3	3.531E+3	
Cs-137	3.02E+1	7.497E+2	3.517E+3	2.859E+3	7.125E+3	
Fe-55	2.69E+0	5.757E+3	3.659E+3	8.235E+4	9.176E+4	
Fe-59	1.22E-1	1.440E+2	4.586E+1	8.971E+0	1.988E+2	
H-3	1.23E+1	2.783E+3	4.001E+4	1.774E+3	4.456E+4	
I-131	2.20E-2	9.587E+1	1.033E+2	2.201E+2	4.193E+2	
Mn-54	8.55E-1	2.027E+3	1.055E+3	7.690E+3	1.077E+4	
Nb-95	9.59E-2	1.352E+2	5.404E+2	3.237E+1	7.079E+2	
Ni-63	1.00E+2	3.289E+2	1.273E+3	8.011E+3	9.613E+3	
Pm-147	2.62E+0	3.403E+1	1.023E+2	5.595E-1	1.369E+2	
Sb-124	1.65E-1	9.889E+1	6.735E+1	1.005E-1	1.663E+2	
Sb-125	2.70E+0	4.748E+1	1.801E+2	2.586E+1	2.535E+2	
Sr-89	1.39E-1	7.916E+0	1.861E+2	3.147E+0	1.971E+2	
Sr-90	2.88E+1	2.396E+1	1.054E+2	1.820E+2	3.114E+2	
Th-232	1.41E+10	4.094E+2	1.000E-5		4.094E+2	
U-238	4.47E+9	3.256E+2	3.256E-3	7.858E-3	3.256E+2	
U-DEP ^a	-	1.484E+2			1.484E+2	
Y-91	1.60E-1	6.270E+0	2.797E+2		2.860E+2	
Zn-65	6.69E-1	3.534E+3	2.075E+3	1.079E+2	5.717E+3	
Zr-95	1.75E-1	8.621E+1	2.936E+2	1.753E+1	3.973E+2	
Total		2.559E+4	6.675E+4	1.764E+5	2.687E+5	
All nuclides		2.607E+4	6.711E+4	1.765E+5	2.697E+5	

a. U-DEP: depleted uranium.

Table 39. 1988 Radionuclides in Quantities Exceeding 100 Curies

Nuclide	Half-Life (Years)	Activity (Ci)				Total
		Class A	Class B	Class C		
Ag-110m	6.91E-1	3.702E+1	7.605E+1	3.694E+3	3.807E+3	
C-14	5.73E+3	1.337E+2	2.338E+1	3.190E+1	1.890E+2	
Ce-141	8.90E-2	1.912E+0	1.116E+2	6.746E-2	1.135E+2	
Ce-144	7.80E-1	3.373E+1	7.296E+2	1.814E+1	7.815E+2	
Co-58	1.94E-1	1.624E+3	2.928E+3	4.704E+3	9.257E+3	
Co-60	5.27E+0	5.237E+3	5.515E+3	4.229E+4	5.304E+4	
Cr-51	7.59E-2	1.645E+3	6.172E+2	1.283E+2	2.391E+3	
Cs-134	2.06E+0	2.194E+2	1.763E+3	2.635E+3	4.618E+3	
Cs-137	3.02E+1	5.993E+2	3.600E+3	8.821E+3	1.302E+4	
Fe-55	2.69E+0	7.696E+3	4.316E+3	7.689E+4	8.891E+4	
Fe-59	1.22E-1	2.110E+2	5.295E+1	1.152E+1	2.754E+2	
H-3	1.23E+1	2.623E+3	3.284E+4	7.859E+2	3.625E+4	
I-131	2.20E-2	3.575E+1	5.819E+1	1.599E+1	1.099E+2	
Mn-54	8.55E-1	2.076E+3	1.049E+3	1.993E+4	2.305E+4	
Nb-95	9.59E-2	4.956E+1	8.748E+2	2.212E+1	9.465E+2	
Ni-63	1.00E+2	3.010E+2	1.551E+3	6.578E+3	8.431E+3	
P-32	3.91E-2	1.002E+2	7.400E-4		1.002E+2	
Pm-147	2.62E+0	6.542E+1	1.487E+2	4.707E+2	6.849E+2	
S-35	2.39E-1	1.081E+2			1.081E+2	
Sb-124	1.65E-1	2.546E+1	8.818E+1	3.541E+1	1.491E+2	
Sb-125	2.70E+0	3.156E+1	2.881E+2	7.698E+2	1.089E+3	
Sr-89	1.39E-1	4.624E+0	2.987E+2	5.530E+0	3.088E+2	
Sr-90	2.88E+1	2.221E+1	9.264E+2	3.037E+3	3.985E+3	
Th-232	1.41E+10	4.242E+2	1.078E-3		4.242E+2	
U-238	4.47E+9	3.483E+2	4.500E-5	2.699E-3	3.483E+2	
U-DEP ^a	-	1.404E+2			1.404E+2	
Y-91	1.60E-1		4.619E+2		4.619E+2	
Zn-65	6.69E-1	4.104E+3	1.281E+3	1.996E+2	5.585E+3	
Zr-95	1.75E-1	3.140E+1	4.715E+2	1.418E+1	5.171E+2	
Total		2.793E+4	6.007E+4	1.711E+5	2.591E+5	
All nuclides		2.824E+4	6.032E+4	1.712E+5	2.598E+5	

a. U-DEP: depleted uranium.

Table 40. 1989 Radionuclides in Quantities Exceeding 100 Curies

Nuclide	Half-Life (Years)	Activity (Ci)				Total
		Class A	Class B	Class C		
Ag-110m	6.91E-1	4.633E+1	8.200E+1	3.789E+1	1.662E+2	
C-14	5.73E+3	2.009E+2	2.461E+1	1.463E+2	3.718E+2	
Ce-141	8.90E-2	7.736E+0	1.311E+2	2.442E+0	1.413E+2	
Ce-144	7.80E-1	3.470E+1	8.559E+2	3.277E+1	9.234E+2	
Co-58	1.94E-1	9.478E+2	3.625E+3	8.207E+3	1.278E+4	
Co-60	5.27E+0	5.606E+3	4.308E+4	2.279E+5	2.766E+5	
Cr-51	7.59E-2	1.784E+3	1.600E+3	9.194E+2	4.303E+3	
Cs-134	2.06E+0	3.518E+2	2.125E+3	1.663E+3	4.140E+3	
Cs-137	3.02E+1	8.865E+2	4.293E+3	1.122E+4	1.640E+4	
Fe-55	2.69E+0	7.983E+3	5.269E+3	3.664E+5	3.797E+5	
Fe-59	1.22E-1	1.814E+2	4.793E+1	1.838E+1	2.477E+2	
H-3	1.23E+1	3.679E+3	9.025E+4	4.267E+3	9.819E+4	
Hf-175	1.92E-1	2.000E-6		3.380E+2	3.380E+2	
Hf-181	1.16E-1	8.091E-3		7.661E+2	7.661E+2	
I-125	1.65E-1	1.082E+2	3.040E-3	2.600E-2	1.082E+2	
I-131	2.20E-2	9.026E+1	1.794E+2	4.056E+0	2.737E+2	
Kr-85	1.07E+1	1.876E+2	1.045E+0	4.263E+0	1.929E+2	
Mn-54	8.55E-1	1.759E+3	1.206E+3	1.965E+4	2.261E+4	
Nb-95	9.59E-2	1.667E+2	1.009E+3	3.325E+1	1.209E+3	
Ni-63	1.00E+2	5.048E+2	2.182E+3	2.558E+4	2.827E+4	
Pm-147	2.62E+0	5.423E+1	1.919E+2	1.127E+3	1.373E+3	
Ru-103	1.08E-1	5.343E+0	8.647E+1	4.791E+1	1.397E+2	
S-35	2.39E-1	2.855E+2			2.855E+2	
Sb-125	2.70E+0	3.192E+2	8.208E+1	1.261E+3	1.662E+3	
Sr-89	1.39E-1	2.855E+1	3.646E+2	9.411E+0	4.025E+2	
Sr-90	2.88E+1	1.537E+1	1.454E+2	7.085E+3	7.245E+3	
Th-232	1.41E+10	2.812E+2	1.720E-4	9.700E-4	2.813E+2	
U-238	4.47E+9	3.165E+2	3.070E-2	1.602E-3	3.166E+2	
U-DEP ^a	-	1.193E+2	4.279E-1		1.197E+2	
Y-91	1.60E-1	1.805E+1	5.609E+2		5.789E+2	
Zn-65	6.69E-1	2.364E+3	3.077E+3	1.453E+1	5.456E+3	
Zr-95	1.75E-1	4.052E+1	5.605E+2	1.560E+1	6.166E+2	
Total		2.837E+4	1.610E+5	6.768E+5	8.662E+5	
All nuclides		2.864E+4	1.612E+5	6.770E+5	8.669E+5	

a. U-DEP: depleted uranium.

Table 41. 1987 Radionuclides Having Half-Lives Exceeding 100 Years

Nuclide	Half-Life (Years)	Activity (Ci)				Total
		Class A	Class B	Class C		
Ag-108m	1.27E+2	7.247E-1				7.247E-1
Al-26	7.40E+5	4.000E-5				4.000E-5
Am-241	4.33E+2	2.317E-1	9.089E-2	1.318E-1	4.544E-1	
Am-243	7.95E+3	1.354E-3		1.000E-6	1.355E-3	
C-14	5.73E+3	1.603E+2	1.175E+1	6.372E+1	2.357E+2	
Cl-36	3.00E+5	2.116E-1				2.116E-1
Cm-248	4.70E+5			6.310E-2	6.310E-2	
Cs-135	3.00E+6	1.455E+0				1.455E+0
I-129	1.60E+7	6.864E-1	1.684E-1	1.662E-1	1.021E+0	
K-40	1.28E+9	1.986E-2				1.986E-2
Nb-94	2.03E+4	1.809E-2	3.321E-2	9.518E-1	1.003E+0	
Ni-59	7.50E+4	8.170E+0	7.347E+0	6.637E+1	8.189E+1	
Ni-63	1.00E+2	3.289E+2	1.273E+3	8.011E+3	9.613E+3	
Np-237	2.14E+6	1.723E-3	1.100E-4	1.903E-2	2.086E-2	
Pa-231	3.25E+4	4.000E-6				4.000E-6
Po-209	1.03E+2	1.100E-5				1.100E-5
Pu-239	2.41E+4	1.300E-1	5.932E-2	5.761E-2	2.469E-1	
Pu-240	6.57E+3	3.689E-2	2.450E-3	1.389E-2	5.322E-2	
Pu-242	3.76E+5	3.760E-3	4.360E-3	3.100E-5	8.151E-3	
Ra-226	1.60E+3	4.363E+0	1.640E-2	2.688E+0	7.068E+0	
Si-32	6.50E+2	5.000E-6				5.000E-6
Tb-158	1.20E+3	3.700E-5				3.700E-5
Tc-99	2.14E+5	1.591E+0	1.434E+0	3.895E+0	6.919E+0	
Te-123	1.20E+13	2.875E-2				2.875E-2
Th-229	7.34E+2	4.000E-6				4.000E-6
Th-230	8.00E+4	1.610E-4				1.610E-4
Th-232	1.41E+10	4.094E+2	1.000E-5			4.094E+2
Th-NAT ^a	1.41E+10	1.042E+1				1.042E+1
TRU-NOS ^a	-	1.701E-1	5.419E-2	1.590E-1	3.833E-1	
U-233	1.59E+5	4.984E-3		2.000E-6	4.986E-3	
U-234	2.45E+5	2.344E+0	5.800E-5	6.440E-4	2.345E+0	
U-235	7.04E+8	9.795E-1	8.000E-6	3.500E-5	9.795E-1	
U-236	2.34E+7	2.033E-2		2.000E-6	2.033E-2	
U-238	4.47E+9	3.256E+2	3.256E-3	7.858E-3	3.256E+2	
U-DEP ^a	-	1.484E+2				1.484E+2
U-NAT ^a	-	3.051E+0				3.051E+0
Total		1.407E+3 (13%)	1.294E+3 (12%)	8.149E+3 (75%)		1.085E+4
Total Without Ni-63		1.078E+3 (87%)	2.097E+1 (2%)	1.383E+2 (11%)		1.237E+3

a. Th-NAT: natural thorium; TRU-NOS: unspecified trans-uranic isotopes; U-DEP: depleted uranium; U-NAT: natural uranium.

Table 42. 1988 Radionuclides Having Half-Lives Exceeding 100 Years

Nuclide	Half-Life (Years)	Activity (Ci)			
		Class A	Class B	Class C	Total
Ag-108m	1.27E+2	1.030E-2			1.030E-2
Am-241	4.33E+2	6.604E-1	8.940E-2	1.711E-1	9.209E-1
C-14	5.73E+3	1.337E+2	2.338E+1	3.190E+1	1.890E+2
C-36	3.00E+5	3.515E-1	5.000E-5		3.516E-1
I-129	1.60E+7	1.042E+0	6.220E-2	8.702E-2	1.192E+0
K-40	1.28E+9	2.999E-3			2.999E-3
Mo-93	3.50E+3	1.000E-6			1.000E-6
Nb-94	2.03E+4	4.494E-2	4.590E-1	2.175E-1	7.214E-1
Ni-59	7.50E+4	9.408E-1	4.722E+0	4.401E+1	4.968E+1
Ni-63	1.00E+2	3.010E+2	1.551E+3	6.578E+3	8.431E+3
Np-237	2.14E+6	4.000E-5	4.500E-4		4.900E-4
Pu-239	2.41E+4	1.176E-1	7.053E-2	1.831E-1	3.712E-1
Pu-240	6.57E+3	3.802E-2	1.107E-2	6.272E-2	1.118E-1
Pu-242	3.76E+5	1.263E-2	1.910E-3	1.549E-2	3.002E-2
Ra-226	1.60E+3	1.126E+1	6.809E-2	1.616E+0	1.294E+1
Re-187	4.30E+10	1.000E-6			1.000E-6
Tb-157	1.50E+2	1.000E-5			1.000E-5
Tb-158	1.20E+3	1.000E-5			1.000E-5
Tc-99	2.14E+5	3.085E+0	1.182E+0	6.110E+0	1.038E+1
Te-123	1.20E+13	2.027E-2			2.027E-2
Th-229	7.34E+3	1.000E-5			1.000E-5
Th-230	8.00E+4	1.190E-3	1.000E-6		1.191E-3
Th-232 ^a	1.41E+10	4.242E+2	1.078E-3		4.242E+2
Th-NAT ^a	1.41E+10	2.150E+1			2.150E+1
TRU-NOS ^a	-	4.330E-1	8.400E-2	5.316E-1	1.049E+0
U-233	1.59E+5	4.000E-6			4.000E-6
U-234	2.45E+5	2.091E+0	6.820E-4	8.940E-4	2.092E+0
U-235	7.04E+8	3.988E-1	2.100E-5	5.605E-3	4.044E-1
U-236	2.34E+7	1.939E-2			1.939E-2
U-238 ^a	4.47E+9	3.483E+2	4.500E-5	2.699E-3	3.483E+2
U-DEP ^a	-	1.404E+2			1.404E+2
U-NAT ^a	-	3.345E+0	1.606E-3		3.346E+0
Total		1.393E+3 (14%)	1.581E+3 (16%)	6.663E+3 (69%)	9.638E+3
Total Without Ni-63		1.092E+3 (90%)	3.013E+1 (2%)	8.492E+1 (7%)	1.207E+3

a. Th-NAT: natural thorium; TRU-NOS: unspecified transuranic isotopes; U-DEP: depleted uranium; U-NAT: natural uranium.

Table 43. 1989 Radionuclides Having Half-Lives Exceeding 100 Years

Nuclide	Half-Life (Years)	Activity (Ci)				Total
		Class A	Class B	Class C		
Ag-108m	1.27E+2			9.460E-3	9.460E-3	
Am-241	4.33E+2	2.165E-1	5.366E-2	4.158E+0	4.429E+0	
Am-243	7.95E+3	1.110E-4			1.110E-4	
C-14	5.73E+3	2.009E+2	2.461E+1	1.463E+2	3.718E+2	
Cd-113	1.30E+15	1.000E-6			1.000E-6	
Cf-36	3.00E+5	3.093E-1			3.093E-1	
Cs-135	3.00E+6	4.960E-2			4.960E-2	
I-129	1.60E+7	4.574E-1	2.217E-2	7.751E-2	5.571E-1	
K-40	1.28E+9	2.070E-4			2.070E-4	
Nb-94	2.03E+4	3.606E-1	3.383E-2	1.810E-1	5.754E-1	
Nd-144	2.40E+15	4.000E-5			4.000E-5	
Ni-59	7.50E+4	2.310E+0	1.000E+1	5.721E+1	6.952E+1	
Ni-63	1.00E+2	5.048E+2	2.182E+3	2.558E+4	2.827E+4	
Np-237	2.14E+6	1.679E-3	3.000E-6		1.682E-3	
Pa-231	3.25E+4	1.700E-5			1.700E-5	
Po-209	1.03E+2	1.100E-5			1.100E-5	
Pu-239	2.41E+4	1.935E-1	4.160E-2	3.410E-1	5.761E-1	
Pu-240	6.57E+3	2.442E-2	3.220E-3	8.109E-2	1.087E-1	
Pu-242	3.76E+5	1.123E-2	3.300E-5	1.861E-2	2.987E-2	
Ra-226	1.60E+3	2.535E+1	7.734E-1	5.295E-1	2.665E+1	
Re-187	4.30E+10	2.000E-6			2.000E-6	
Tb-157	1.50E+2	2.000E-6			2.000E-6	
Tb-158	1.20E+3	2.000E-6			2.000E-6	
Tc-99	2.14E+5	4.944E+0	6.395E-1	5.566E+0	1.115E+1	
Te-123	1.20E+13	3.999E-2			3.999E-2	
Th-229	7.34E+2	2.000E-6			2.000E-6	
Th-230	8.00E+4	1.162E-3	1.500E-5		1.177E-3	
Th-232 ^a	1.41E+10	2.812E+2	1.720E-4	9.700E-4	2.813E+2	
Th-NAT ^a	1.41E+10	7.913E+0			7.913E+0	
TRU-NOS ^a	-	1.403E-1	6.080E-3	4.079E-2	1.871E-1	
U-233	1.59E+5	4.585E-2			4.585E-2	
U-234	2.45E+5	3.973E+0	1.400E-4	8.119E-3	3.981E+0	
U-235	7.04E+8	3.401E+0	1.000E-6	9.800E-5	3.401E+0	
U-236	2.34E+7	1.083E-1			1.083E-1	
U-238 ^a	4.47E+9	3.165E+2	3.070E-2	1.602E-3	3.166E+2	
U-DEP ^a	-	1.193E+2	4.279E-1		1.197E+2	
U-NAT ^a	-	4.181E+0	3.410E-4		4.181E+0	
Total		1.477E+3 (5%)	2.219E+3 (8%)	2.579E+4 (87%)	2.949E+4	
Total Without Ni-63		9.719E+2 (79%)	3.664E+1 (3%)	2.145E+2 (18%)	1.223E+3	

a. Th-NAT: natural thorium; TRU-NOS: unspecified trans-uranic isotopes; U-DEP: depleted uranium; U-NAT: natural uranium.

But for this report, the 100-year half-life criterion was chosen largely as a means of illustrating a few points. As indicated in Tables 41 through 43, with the exception of Ni-63, which has a 100-year half-life, most of the long-lived activity resides in Class A waste. Class C waste initially contains most of the LLW activity, followed by Class B waste and then Class A waste. But eventually, Class A waste will contain most of the activity, followed by Class C waste. Class B waste will contain the least activity.

It would be an instructive exercise to perform decay calculations to determine when the cross-over points occur. The results of a simple analysis, in which individual radionuclides were decayed without regard to decay chains, suggest that for all three years, Class B waste decays to the level of Class A waste after about 100 years. For waste disposed in 1987 and 1988, the Class C waste activity decays to the level of Class A waste activity after about 300 years. For waste disposed in 1989, the Class C waste activity decays to the level of the Class A waste activity after about 500 years.

The data also suggest that the principal reason that it takes so long for Class C waste to decay to Class A levels is Ni-63. Nickel-63 has a half-life of about 100 years and is principally found in Class C waste. (Over the three years considered, from 78 to 90 percent of the Ni-63 activity was delivered in Class C waste.) It is a weak beta-emitter (0.067 MeV maximum) and does not emit gamma radiation. It is principally generated by nuclear power plants, mostly in activated metal wastes but also in process and dry active wastes. In 1987, about 72 percent of all Ni-63 activity was found in activated metal wastes.

Absent Ni-63, most of the long-lived activity in LLW is contributed by Ni-59, C-14, and various uranium and thorium isotopes. Ni-59 is principally reported in activated metal wastes. The other isotopes are found in a number of waste streams. An indication of the distribution of these isotopes among different generators is provided in Table 44.

Table 44 was assembled from data in Appendices A and B, and indicates the percent distribution of a number of radionuclides among five categories of waste generators. The data are for waste delivered to the two USE disposal facilities during 1989. The table also indicates the percentage of each radionuclide that was disposed at these two USE facilities. This gives an indication of the representativeness of the distributions.

Sixty-three percent of the C-14 activity was disposed at the two USE facilities, and of this activity, nearly 90 percent was delivered in waste from industrial generators. For thorium and uranium, however, the distribution is not as clear-cut. Almost all of the long-lived thorium was disposed at the Barnwell disposal facility. But of the thorium activity that was delivered to the two USE facilities, most was contributed by industrial generators. (Thorium, of course, occurs naturally as Th-232. However, in the data obtained from USE, natural thorium was cited separately from Th-232. The separate citations have been retained in this report.)

Table 44. U.S. Ecology 1989 Distribution of Activity Among General Industries
for Selected Radionuclides

Nuclide	Activity Distribution (%)					USE % of Tot. Act
	Colleges	Government	Hospitals	Industry	Utilities	
Am-241	1.11E+00	6.70E-01	9.97E-02	9.74E+01	7.08E-01	9.18E+01
Am-243	1.41E+00	0.00E+00	0.00E+00	4.23E+01	5.63E+01	6.40E+01
C-14	1.85E+00	1.22E-01	6.84E-01	8.99E+01	7.45E+00	6.38E+01
Cm-242	0.00E+00	0.00E+00	0.00E+00	3.24E-03	1.00E+02	3.19E+00
Cm-243	0.00E+00	0.00E+00	0.00E+00	5.21E-02	9.99E+01	1.12E+01
Cm-244	8.96E-02	1.51E+01	2.09E+01	1.79E-01	6.37E+01	8.56E-01
Co-60	1.37E-01	9.70E-03	2.34E-01	5.22E+01	4.74E+01	7.39E+00
Cs-135	0.00E+00	0.00E+00	0.00E+00	0.00E+00	1.00E+02	1.27E-01
Cs-137	1.26E+01	1.82E-02	2.12E-02	2.57E+01	6.16E+01	4.72E+01
Fe-55	2.67E-04	8.41E-03	3.17E-05	9.99E-03	1.00E+02	4.56E+00
H-3	2.85E-01	1.11E+00	5.94E-02	9.82E+01	3.54E-01	8.44E+01
I-129	4.30E-02	1.26E-03	2.06E+00	1.59E+01	8.20E+01	1.42E+01
Nb-94	6.53E+01	2.82E-01	0.00E+00	1.12E+01	2.32E+01	1.18E+01
Ni-59	0.00E+00	0.00E+00	0.00E+00	2.97E-03	1.00E+02	1.51E+01
Ni-63	1.69E-02	1.00E-02	2.14E-03	1.71E+00	9.83E+01	6.54E+00
Np-237	0.00E+00	0.00E+00	0.00E+00	2.56E+01	7.44E+01	3.88E+01
Pu-236	0.00E+00	1.00E+02	0.00E+00	0.00E+00	0.00E+00	1.00E+02
Pu-238	0.00E+00	9.06E-04	0.00E+00	5.95E+01	4.05E+01	3.13E+01
Pu-239	4.08E-02	4.80E+00	0.00E+00	1.72E+01	7.80E+01	2.30E+01
Pu-240	0.00E+00	3.95E-02	0.00E+00	2.71E+01	7.28E+01	3.73E+01
Pu-241	1.00E-03	0.00E+00	0.00E+00	6.94E+00	9.31E+01	1.32E+01
Pu-242	0.00E+00	8.98E-02	0.00E+00	3.36E+01	6.63E+01	3.73E+00
Ra-226	8.56E+00	5.09E+00	5.45E+01	3.10E+01	8.44E-01	9.71E+01
Sr-90	1.74E-03	2.20E-03	8.07E-03	8.98E-01	9.91E+01	7.17E+01
Tc-99	9.22E+00	3.25E-02	2.12E+00	1.58E+01	7.28E+01	2.76E+01
Th-230	2.51E+01	5.14E-01	0.00E+00	7.44E+01	0.00E+00	9.92E+01
Th-232	3.43E-01	9.22E-02	1.65E-02	9.95E+01	0.00E+00	3.96E-01
Th-NAT ^a	6.19E-04	7.92E-03	0.00E+00	1.00E+02	0.00E+00	1.00E+02
U-232	0.00E+00	0.00E+00	0.00E+00	1.00E+02	0.00E+00	1.00E+02
U-233	2.40E-02	5.25E+01	1.31E+00	4.60E+01	1.22E-01	1.00E+02
U-234	0.00E+00	0.00E+00	0.00E+00	1.00E+02	4.86E-02	2.21E+01
U-235	1.40E-02	4.29E-02	0.00E+00	9.99E+01	3.37E-02	8.63E+00
U-236	0.00E+00	0.00E+00	0.00E+00	1.00E+02	0.00E+00	8.31E-02
U-238	1.23E-01	1.03E+00	5.21E-02	9.88E+01	2.82E-03	8.27E+00
U-NAT ^a	1.05E-01	3.19E-02	5.81E-03	9.99E+01	0.00E+00	1.00E+02
U-DEP ^a	0.00E+00	2.53E+00	0.00E+00	9.75E+01	0.00E+00	3.18E-01

a. Th-NAT: natural thorium; U-NAT: natural uranium; U-DEP: depleted uranium.

A somewhat similar situation exists for uranium. The bulk of the uranium activity during 1989 was contributed by depleted uranium and U-238. Little depleted uranium was reported for the USE facilities, but of the activity delivered to these facilities in 1989, 97 percent was generated by industrial generators. Only 8 percent of the U-238 activity was disposed at the USE facilities. Of this 26.2 Ci of U-238 activity, nearly 99 percent was generated by industrial generators. A similar distribution is probably applicable to U-238 disposed at the Barnwell facility.

Most of the uranium activity was probably contributed by waste generators outside of the nuclear fuel cycle. Only 3.4 curies of U-235 was disposed in 1989. If one assumes that all U-235 was generated by nuclear fuel cycle activities, then the activity of U-238 that would correspond to the U-235 activity can be estimated by considering typical enrichments. Assuming enrichment to 4 weight-percent U-235, only about 13 curies of U-238 would be disposed. Assuming no enrichment, about 76 curies of U-238 would be disposed. This implies that of the 317 curies of U-238 disposed in 1989, only about 4 to 24 percent of the activity would be generated by nuclear fuel cycle licensees.

8. OTHER INFORMATION

Table 45 summarizes the presence of chelating agents in waste delivered during 1987 through 1989 to the two USE disposal facilities. The table lists volumes, activities, and other information for any waste that contains chelating agents in concentrations exceeding 0.1 percent by weight. One may note that although the current USE manifest contains a waste description specifically for solidified chelates, chelating agents can be delivered in other waste streams as well.

Information about the total number of LLW shipments made to the three disposal facilities is summarized below. Clearly, over the last few years the total number of shipments to the disposal facilities has been considerably reduced.

<u>Year</u>	<u>Barnwell</u>	<u>Richland</u>	<u>Beatty</u>	<u>Total</u>
1987	2,681	2,336	770	5,787
1988	2,734	770	239	3,743
1989	2,997	816	302	4,115

The number of individual waste containers delivered to the two USE disposal facilities is summarized below.

<u>Year</u>	<u>Richland</u>	<u>Beatty</u>	<u>Total</u>
1987	36,973	26,351	63,324
1988	29,634	7,778	37,412
1989	33,675	8,812	42,487

Table 46 summarizes the distribution of waste container volumes for waste delivered to the Richland and Beatty facilities during 1988 and 1989. Over

Table 45. LLW Delivered to U.S. Ecology Disposal Facilities and Containing Chelating Agents in Concentrations Exceeding 0.1 Weight Percent

<u>Year</u>	<u>Industry Group</u>	<u>Volume (ft³)</u>	<u>Activity (Ci)</u>	<u>Waste and Stab. Class</u>	<u>Waste Description</u>
1988	Nuclear utility	2.616E+2	3.364E+1	AS ^a	Dewatered resins
	Nuclear utility	1.817E+2	1.377E+2	AS	Solidified resins
	Nuclear utility	4.920E+3	5.350E-1	AU ^a	Solidified chelates
	Government	<u>2.250E+1</u>	<u>2.301E-3</u>	AU	Solidified liquids
		5.386E+3	1.718E+2		
1989	Nuclear utility	2.289E+3	4.318E+1	AU	Solidified chelates
	Government	9.359E+1	1.490E-3	AU	Solidified chelates
	Government	4.500E+1	4.211E-3	AU	Solidified liquids
	Industrial	<u>7.051E+2</u>	<u>1.051E+0</u>	AU	Solidified chelates
		3.133E+3	4.424E+1		

a. AS: Class A, stable; AU: Class A, unstable.

Table 46. U.S. Ecology 1988 and 1989 Distribution
of Waste Container Volumes (ft³)

CTR Count	CTR Volume										
5	0.02	2	11.51	3	48.20	1	59.75	27	181.70		
2	0.14	1	11.59	3	48.23	9	60.00	21	182.00		
1	0.20	1011	11.60	2	48.30	1	60.50	20	183.20		
4	0.24	177	11.66	1	48.60	3	61.00	18	186.00		
5	0.45	626	12.10	1	48.70	2	61.50	20	195.40		
362	0.47	12.33	7	49.00	1	62.00	2	200.00			
206	0.54	12.59	7	49.20	1	70.00	2	202.00			
6	0.61	84	13.10	9	49.22	2	72.00	3	202.10		
581	0.67	13.30	9	49.30	2	73.40	10	205.00			
2	0.68	11	14.30	2	49.40	1	76.20	42	206.10		
37	1.07	14.50	11	49.50	1	77.00	1	207.30			
91	1.10	15.00	6	49.70	1	80.00	3	210.00			
1	1.20	24	15.98	15	49.80	2	82.00	3	229.00		
12	1.39	16.00	23	49.90	1	83.00	2	227.00			
34	1.34	16.00	104	50.00	1	84.00	16	227.00			
2	1.40	1.56	479	50.15	4	84.00	6	228.50			
12	2	21.40	50.20	52	86.00	1	121.30	2	268.00		
34	2	21.70	50.25	6	86.25	1	126.80	1	293.00		
2	2.00	23.20	50.30	6	87.00	1	126.50	1	294.00		
1	2.40	23.24	50.40	1	87.80	1	134.60	1	296.00		
12	2	24.00	50.50	75	88.00	1	135.00	2	313.00		
34	2	25.70	50.50	202	88.60	1	135.80	1	316.00		
2	2.63	27.75	51.40	6	89.00	1	136.40	1	346.00		
1	2.92	29.20	51.60	63	90.00	1	138.00	1	384.10		
12	2	29.38	52.00	186	92.00	1	139.00	1	395.00		
34	2	29.34	52.30	148	92.50	1	139.10	9	1150.00		
2	3.40	29.34	52.70	5	93.00	1	142.00	1	1450.00		
1	3.60	30.00	52.70	5	93.50	1	144.00	10	147.70		
12	2	30.20	52.80	55	93.50	1	144.70	1	147.70		
34	2	30.21	53.20	38	94.00	1	155.00	1	155.80		
2	3.94	30.94	53.30	4	94.00	1	160.00	1	160.00		
12	1	31.39	53.70	59	95.00	1	161.00	2	161.00		
34	1	32.33	53.80	459	96.00	6	161.00	1	161.00		
2	4.18	34.00	54.00	2	96.44	1	163.00	1	163.00		
1	4.50	34.30	54.20	174	96.60	1	165.00	1	165.00		
2	5.59	40.00	54.30	7	99.67	1	167.00	1	167.00		
1	6.20	40.80	54.70	17	100.00	1	170.00	1	170.00		
2	7.38	42.00	55.00	1	100.50	1	172.00	1	172.00		
1	7.50	42.00	55.20	42	101.00	2	172.50	1	172.50		
2	8.66	43.00	55.30	32	101.00	1	174.00	1	174.00		
1	8.76	44.10	55.70	5	102.00	5	175.00	1	175.00		
2	9.76	44.10	56.00	8	102.00	6	176.00	1	176.00		
1	10.00	45.21	56.20	17	103.00	4	177.30	1	177.30		
2	10.60	45.21	56.70	1	103.02	1	177.50	1	177.50		
1	10.70	46.79	57.10	14	104.50	1	186.00	1	186.00		
2	10.77	46.79	57.10	11	105.00	1	187.00	1	187.00		
1	11.30	46.80	58.40	78	107.00	3	188.00	1	188.00		
2	11.36	47.50	58.60	114	107.50	5	188.60	1	188.60		
1	11.40	47.80	59.00	117	107.64	10	189.10		189.10		
2	11.50	48.00	59.50	893							

three-quarters of the containers had a volume of 7.5 ft³, an unsurprising situation.

Finally, Table 47 provides a distribution of the radiation levels at the surfaces of the waste containers delivered to the Richland and Beatty disposal facilities during 1988 and 1989. Radiation levels are in units of milliRoentgens per hour (mR/hr), and are separated into ten ranges. The table lists the percentage of all containers that had surface radiation levels within each range, as well as the average radiation level within each range. For both years, nearly 90 percent of the waste volume had surface radiation levels less than 100 mR/hr.

REFERENCES

1. Vance and Associates, "An Assessment of 10 CFR 61 Waste Classification Methods," August 1986.
2. Robertson, D.E., et al., "Below Regulatory Concern Owners Group: Radionuclide Characterization of Potential BRC Waste Types from Nuclear Power Stations," EPRI-5677, Battelle, Pacific Northwest Laboratories for the Electric Power Research Institute, March 1989.

Table 47. U.S. Ecology 1988 and 1989 Distribution of Waste Container Surface Radiation Levels (mR/hr)

<u>Year</u>	<u>Range (mR/hr)</u>	<u>Percent in Range</u>	<u>Average in Range (mR/hr)</u>
1988	.00 to .01	1.24	9.96E-3
	.02 to .10	12.9	6.69E-2
	.11 to 1.00	26.7	4.75E-1
	1.01 to 10.00	24.7	3.40E+0
	10.01 to 100.00	32.2	3.76E+1
	100.01 to 1,000.00	6.75	3.09E+2
	1,000.01 to 10,000.00	3.45	1.85E+3
	10,000.01 to 100,000.00	.913	3.63E+4
	100,000.01 to 1,000,000.00	.080	2.66E+5
	1,000,000.01 to 99,999,999.99	.000	0.00E+0
Average:			1.52E+2
1989	.00 to .01	2.69	1.00E-2
	.02 to .10	16.9	6.15E-2
	.11 to 1.00	28.2	5.13E-1
	1.01 to 10.00	22.9	3.86E+0
	10.01 to 100.00	17.2	3.83E+1
	100.01 to 1,000.00	6.51	3.89E+2
	1,000.01 to 10,000.00	4.67	2.28E+3
	10,000.01 to 100,000.00	.891	3.54E+4
	100,000.01 to 1,000,000.00	.096	3.41E+5
	1,000,000.01 to 99,999,999.99	.005	1.00E+7
Average:			4.46E+2

GLOSSARY

<u>Element</u>	<u>Symbol</u>	<u>Element</u>	<u>Symbol</u>	<u>Element</u>	<u>Symbol</u>
Actinium	Ac	Hafnium	Hf	Praseodymium	Pr
Aluminum	Al	Helium	He	Promethium	Pm
Americium	Am	Holmium	Ho	Protactinium	Pa
Antimony	Sb	Hydrogen	H	Radium	Ra
Argon	A	Indium	In	Radon	Rn
Arsenic	As	Iodine	I	Rhenium	Re
Astatine	At	Iridium	Ir	Rhodium	Rh
Barium	Ba	Iron	Fe	Rubidium	Rb
Berkelium	Bk	Krypton	Kr	Ruthenium	Ru
Beryllium	Be	Khurchatorium	Ku	Samarium	Sm
Bismuth	Bi	Lanthanum	La	Scandium	Sc
Boron	B	Lawrencium	Lw	Selenium	Se
Bromine	Br	Lead	Pb	Silicon	Si
Cadmium	Cd	Lithium	Li	Silver	Ag
Calcium	Ca	Lutecium	Lu	Sodium	Na
Californium	Cf	Magnesium	Mg	Strontium	Sr
Carbon	C	Manganese	Mn	Sulfur	S
Cerium	Ce	Mendelevium	Md	Tantalum	Ta
Cesium	Cs	Mercury	Hg	Technetium	Tc
Chlorine	Cl	Molybdenum	Mo	Tellurium	Te
Chromium	Cr	Neodymium	Nd	Terbium	Tb
Cobalt	Co	Neon	Ne	Thallium	Tl
Copper	Cu	Neptunium	Np	Thorium	Th
Curium	Cm	Nickel	Ni	Thulium	Tm
Dysprosium	Dy	Niobium	Nb	Tin	Sn
Einsteinium	Es	Nitrogen	N	Titanium	Ti
Erbium	Er	Nobelium	No	Tungsten	W
Europium	Eu	Osmium	Os	Uranium	U
Fermium	Fm	Oxygen	O	Vanadium	V
Fluorine	F1	Palladium	Pd	Xenon	Xe
Francium	Fr	Phosphorus	P	Ytterbium	Yb
Gadolinium	Gd	Platinum	Pt	Yttrium	Y
Gallium	Ga	Plutonium	Pu	Zinc	Zn
Germanium	Ge	Polonium	Po	Zirconium	Zr
Gold	Au	Potassium	K		

APPENDIX A

DISPOSAL FACILITY RADIONUCLIDE DISTRIBUTION BY WASTE CLASS

APPENDIX A

DISPOSAL FACILITY RADIONUCLIDE DISTRIBUTION BY WASTE CLASS

This appendix contains nine tables listing radionuclide distributions in low-level waste (LLW) disposed during 1987, 1988, and 1989 in each of the three operating LLW disposal facilities. These disposal facilities are, in tabulated order, the Barnwell, SC, disposal facility operated by Chem-Nuclear Systems, Inc. and the Richland, WA, and Beatty, NV, disposal facilities operated by U.S. Ecology, Inc. Each of the tables lists radionuclide activities in units of curies and as a function of waste class.

The tables were created from lists of radionuclide identities and activities obtained from the disposal facility operators. A few observations are in order.

On U.S. Ecology shipment manifests, shippers identify the physical and chemical characteristics of a container of waste using an index code list. Until 1988, this index code list did not include a waste stream description specifically for activated metal wastes. For these years, U.S. Ecology kept informal track of delivery of activated metal wastes by flagging Ni-63 activities contained in these wastes. Thus, for the Richland and Beatty disposal facilities during 1987, Ni-63 inventories within activated metal wastes are denoted Ni-63AM.

Anomalies in the data can be occasionally observed. Occasionally, for example, inventories of silicon and praseodymium were reported without the isotopic numbers. These nuclides are denoted in these tables with the suffix, -NOS. Also, stable isotopes are sometimes listed. These anomalies do not represent a significant activity.

Otherwise, the following abbreviations are used: U-NAT means natural uranium, U-DEP means depleted uranium, Th-NAT means natural thorium (essentially Th-232), and TRU means an unspecified mixture of transuranic isotopes.

Table A-1. Barnwell 1987 Radionuclide Distribution (Ci) by Waste Class

Nuclide	Class A	Class B	Class C	Total
Ag-108m	2.000E-05	0.000E+00	0.000E+00	2.000E-05
Ag-110	1.395E+01	1.654E+01	7.777E+00	3.826E+01
Ag-110m	9.347E+00	5.039E+01	7.089E+00	6.683E+01
Am-241	4.345E-02	7.470E-02	7.830E-03	1.260E-01
As-76	1.800E-03	0.000E+00	0.000E+00	1.800E-03
Ba-133	1.000E-04	0.000E+00	0.000E+00	1.000E-04
Ba-140	6.848E+00	7.095E+00	8.526E+00	2.247E+01
Bi-207	0.000E+00	2.276E+01	0.000E+00	2.276E+01
Ca-45	8.006E-02	0.000E+00	0.000E+00	8.006E-02
Cd-109	8.763E-01	0.000E+00	0.000E+00	8.763E-01
Ce-139	1.076E-02	0.000E+00	0.000E+00	1.076E-02
Ce-141	1.993E+00	7.010E+01	1.479E+00	7.357E+01
Ce-144	1.562E+01	4.431E+02	4.087E+00	4.628E+02
Cf-252	0.000E+00	0.000E+00	8.900E-03	8.900E-03
Ci-36	2.420E-03	0.000E+00	0.000E+00	2.420E-03
Cm-242	6.392E-02	1.677E-01	4.555E-01	6.871E-01
Cm-243	8.130E-03	3.587E-02	5.150E-03	4.915E-02
Cm-244	3.077E-02	3.299E-02	4.958E-02	1.133E-01
Cm-248	0.000E+00	0.000E+00	6.310E-02	6.310E-02
Co-56	0.000E+00	1.250E+00	0.000E+00	1.250E+00
Co-57	1.984E+00	2.192E+01	5.805E+00	2.971E+01
Co-58	7.996E+02	1.991E+03	4.698E+03	7.488E+03
Co-59	9.506E+00	2.372E-01	0.000E+00	9.743E+00
Co-60	3.875E+03	5.232E+03	5.989E+04	6.900E+04
Cr-51	2.529E+03	1.149E+03	8.998E+01	3.768E+03
Cr-57	2.000E-04	0.000E+00	0.000E+00	2.000E-04
Cs-134	2.619E+02	1.333E+03	1.511E+03	3.106E+03
Cs-135	1.455E+00	0.000E+00	0.000E+00	1.455E+00
Cs-136	1.291E+00	1.270E+00	1.403E+00	3.964E+00
Cs-137	6.524E+02	2.627E+03	2.606E+03	5.885E+03
Cs-138	1.113E-01	0.000E+00	0.000E+00	1.113E-01
C-14	3.988E+01	1.047E+01	5.518E+01	1.055E+02
Eu-152	3.618E-02	0.000E+00	0.000E+00	3.618E-02
Eu-154	3.069E-02	0.000E+00	0.000E+00	3.069E-02
Fe-55	5.079E+03	3.332E+03	7.774E+04	8.615E+04
Fe-59	1.181E+02	3.632E+01	8.971E+00	1.634E+02
Gd-153	3.024E-02	0.000E+00	0.000E+00	3.024E-02
Hg-203	7.000E-04	0.000E+00	0.000E+00	7.000E-04
H-3	2.078E+02	6.007E+03	9.219E+02	7.137E+03
In-111	2.953E-02	0.000E+00	0.000E+00	2.953E-02
In-114	4.400E-03	0.000E+00	0.000E+00	4.400E-03
In-114m	5.500E-03	0.000E+00	0.000E+00	5.500E-03
I-125	5.051E+00	0.000E+00	0.000E+00	5.051E+00
I-126	3.000E-05	0.000E+00	0.000E+00	3.000E-05
I-129	4.848E-01	1.456E-01	6.754E-02	6.979E-01

Table A-1 (Continued)

<u>Nuclide</u>	<u>Class A</u>	<u>Class B</u>	<u>Class C</u>	<u>Total</u>
I-131	9.080E+01	8.347E+01	2.201E+02	3.943E+02
I-132	2.125E-02	0.000E+00	0.000E+00	2.125E-02
I-133	5.668E-01	7.238E-01	0.000E+00	1.291E+00
Kr-85	1.718E+01	3.349E+00	4.460E+00	2.499E+01
K-40	1.984E-02	0.000E+00	0.000E+00	1.984E-02
La-140	9.519E+00	8.805E+00	3.630E-02	1.836E+01
La-141	6.300E-04	0.000E+00	0.000E+00	6.300E-04
Mn-54	1.724E+03	9.166E+02	7.375E+03	1.001E+04
Mo-99	7.957E-01	1.107E-01	2.978E+00	3.885E+00
Na-22	2.723E-02	0.000E+00	0.000E+00	2.723E-02
Na-24	2.009E-01	0.000E+00	0.000E+00	2.009E-01
Nb-94	1.808E-02	3.321E-02	9.512E-01	1.002E+00
Nb-95	8.805E+01	5.400E+02	3.075E+01	6.588E+02
Nb-97	1.403E-01	7.021E-01	1.400E-01	9.824E-01
Ni-59	3.372E+00	7.231E+00	6.123E+01	7.184E+01
Ni-63	2.725E+02	1.141E+03	7.674E+03	9.087E+03
Np-237	1.800E-04	1.100E-04	1.900E-02	1.929E-02
Pa-233	3.600E-04	0.000E+00	0.000E+00	3.600E-04
Pb-210	1.000E-05	0.000E+00	0.000E+00	1.000E-05
Pm-147	1.402E+01	1.021E+02	0.000E+00	1.161E+02
Po-210	1.500E-03	0.000E+00	0.000E+00	1.500E-03
Pr-NOS	1.496E-01	0.000E+00	0.000E+00	1.496E-01
Pu-234	2.000E-05	0.000E+00	0.000E+00	2.000E-05
Pu-238	3.570E-02	5.397E-02	9.680E-03	9.935E-02
Pu-239	1.392E-02	3.262E-02	2.837E-02	7.491E-02
Pu-240	9.710E-03	1.190E-03	0.000E+00	1.090E-02
Pu-241	1.070E+01	6.468E+00	8.547E+00	2.572E+01
Pu-242	9.000E-05	4.360E-03	0.000E+00	4.450E-03
P-32	2.691E+00	1.600E-04	7.000E-05	2.691E+00
P-33	2.000E-05	0.000E+00	1.950E-03	1.970E-03
Ra-226	1.214E-01	4.500E-03	0.000E+00	1.259E-01
Rb-86	2.510E-03	0.000E+00	0.000E+00	2.510E-03
Rh-106	4.370E-03	0.000E+00	0.000E+00	4.370E-03
Ru-103	1.821E+00	4.567E+01	5.629E-01	4.805E+01
Ru-105	3.800E-04	0.000E+00	0.000E+00	3.800E-04
Ru-106	6.536E+00	2.307E+01	5.820E+00	3.543E+01
Sb-122	6.553E-02	9.258E+00	2.929E+00	1.225E+01
Sb-124	5.561E+00	2.591E+00	1.005E-01	8.252E+00
Sb-125	6.918E+00	1.740E+02	2.524E+01	2.061E+02
Sc-46	7.229E-02	0.000E+00	0.000E+00	7.229E-02
Se-75	1.546E-02	0.000E+00	0.000E+00	1.546E-02
Si-NOS	2.380E-03	0.000E+00	0.000E+00	2.380E-03
Sn-113	2.888E-01	1.783E+00	2.779E+00	4.851E+00
Sr-85	2.186E-02	0.000E+00	0.000E+00	2.186E-02
Sr-89	7.322E+00	1.766E+02	2.847E+00	1.868E+02
Sr-90	5.425E+00	5.399E+01	1.613E+02	2.207E+02
Sr-92	2.431E+00	6.991E+00	0.000E+00	9.422E+00
S-35	1.507E+00	0.000E+00	3.620E-02	1.543E+00

Table A-1 (Continued)

Nuclide	Class A	Class B	Class C	Total
Tc-99	7.590E-01	1.391E+00	3.762E+00	5.912E+00
Tc-99m	3.146E-01	7.472E-01	0.000E+00	1.062E+00
Te-125	8.740E-03	2.984E-01	0.000E+00	3.071E-01
Te-125m	2.410E-02	5.339E-02	0.000E+00	7.749E-02
Th-230	1.000E-05	0.000E+00	0.000E+00	1.000E-05
Th-232	4.093E+02	1.000E-05	0.000E+00	4.093E+02
Tl-201	1.208E-02	0.000E+00	0.000E+00	1.208E-02
TRU	1.701E-01	5.419E-02	1.590E-01	3.833E-01
U-234	1.218E+00	0.000E+00	0.000E+00	1.218E+00
U-235	8.549E-01	0.000E+00	0.000E+00	8.549E-01
U-236	1.048E-02	0.000E+00	0.000E+00	1.048E-02
U-237	1.000E-05	0.000E+00	0.000E+00	1.000E-05
U-238	1.885E+02	3.110E-03	7.730E-03	1.885E+02
U-DEP	1.482E+02	0.000E+00	0.000E+00	1.482E+02
W-187	1.500E-03	0.000E+00	0.000E+00	1.500E-03
Xe-131	1.452E+00	1.740E+01	0.000E+00	1.885E+01
Xe-131m	1.254E+00	7.035E-01	0.000E+00	1.958E+00
Xe-133	3.213E+00	2.654E+00	1.309E+00	7.177E+00
Yb-169	1.000E-05	0.000E+00	0.000E+00	1.000E-05
Y-91	6.270E+00	2.797E+02	0.000E+00	2.860E+02
Zn-65	2.801E+03	2.042E+03	1.079E+02	4.951E+03
Zr-95	6.005E+01	2.933E+02	1.689E+01	3.702E+02
Total	1.953E+04	2.830E+04	1.633E+05	2.111E+05

Table A-2. Barnwell 1988 Radionuclide Distribution (Ci) by Waste Class

Nuclide	Class A	Class B	Class C	Total
Ag-108m	1.800E-04	0.000E+00	0.000E+00	1.800E-04
Ag-110	1.287E-02	0.000E+00	9.740E-02	1.103E-01
Ag-110m	1.578E+01	2.713E+01	3.657E+03	3.700E+03
Am-241	2.613E-01	8.582E-02	4.240E-02	3.895E-01
Am-242	1.000E-05	0.000E+00	1.110E-03	1.120E-03
As-76	7.949E-02	0.000E+00	0.000E+00	7.949E-02
Au-198	4.000E-05	0.000E+00	0.000E+00	4.000E-05
Ba-131	2.561E+01	0.000E+00	0.000E+00	2.561E+01
Ba-133	3.400E-04	0.000E+00	5.645E+00	5.646E+00
Ba-137m	0.000E+00	1.548E-02	7.393E-01	7.548E-01
Ba-140	2.639E+00	1.615E+01	0.000E+00	1.879E+01
Be-7	8.149E-01	0.000E+00	0.000E+00	8.149E-01
Ca-45	7.180E-02	0.000E+00	0.000E+00	7.180E-02
Cd-109	3.094E+00	0.000E+00	0.000E+00	3.094E+00
Ce-141	1.316E+00	1.116E+02	4.080E-02	1.129E+02
Ce-144	3.085E+01	7.282E+02	1.352E+01	7.725E+02
Cf-36	1.286E-02	5.000E-05	0.000E+00	1.291E-02
Cm-242	1.628E-01	1.449E-01	7.912E-01	1.099E+00
Cm-243	1.299E-01	3.164E-02	1.004E-02	1.716E-01
Cm-244	2.304E-02	3.026E-02	8.025E-02	1.336E-01
Co-57	9.566E+00	4.702E+01	7.755E+00	6.435E+01
Co-58	1.485E+03	2.763E+03	4.597E+03	8.844E+03
Co-59	1.400E-04	0.000E+00	0.000E+00	1.400E-04
Co-60	4.264E+03	5.209E+03	4.189E+04	5.136E+04
Cr-51	1.297E+03	6.147E+02	1.203E+02	2.032E+03
Cs-134	1.792E+02	1.425E+03	1.860E+03	3.464E+03
Cs-136	1.366E-01	4.181E+00	3.104E+00	7.422E+00
Cs-137	5.196E+02	2.895E+03	4.333E+03	7.747E+03
Cs-144	1.000E-05	0.000E+00	0.000E+00	1.000E-05
Cu-64	8.981E-01	0.000E+00	0.000E+00	8.981E-01
C-14	4.420E+01	2.183E+01	2.515E+01	9.118E+01
Eu-154	1.000E-05	0.000E+00	4.816E-01	4.816E-01
Eu-155	3.402E-02	5.300E-03	5.300E-03	4.462E-02
Fe-55	6.131E+03	4.035E+03	7.667E+04	8.683E+04
Fe-59	2.024E+02	5.291E+01	1.112E+01	2.664E+02
Ga-67	2.000E-03	0.000E+00	0.000E+00	2.000E-03
Gd-153	2.568E-02	0.000E+00	0.000E+00	2.568E-02
Hf-181	1.062E+00	0.000E+00	0.000E+00	1.062E+00
H-3	1.346E+02	8.793E+03	7.837E+02	9.712E+03
In-111	1.964E-02	0.000E+00	0.000E+00	1.964E-02
In-114	7.550E-03	0.000E+00	0.000E+00	7.550E-03
Ir-192	7.800E-04	0.000E+00	0.000E+00	7.800E-04
I-125	7.047E+00	5.600E-04	2.500E-02	7.073E+00
I-126	4.651E-02	0.000E+00	0.000E+00	4.651E-02
I-129	9.892E-01	5.914E-02	6.899E-02	1.117E+00

Table A-2 (Continued)

Nuclide	Class A	Class B	Class C	Total
I-131	3.197E+01	5.153E+01	1.247E+01	9.597E+01
I-132	1.400E-02	0.000E+00	0.000E+00	1.400E-02
I-133	1.940E+00	0.000E+00	2.071E+00	4.012E+00
I-134	3.721E-01	0.000E+00	0.000E+00	3.721E-01
Kr-85	1.203E+01	6.807E-01	4.055E+00	1.677E+01
K-40	2.870E-03	0.000E+00	0.000E+00	2.870E-03
La-140	3.683E+00	4.352E+00	9.496E-02	8.131E+00
Mn-54	1.826E+03	1.008E+03	1.988E+04	2.271E+04
Mo-99	2.171E-01	0.000E+00	0.000E+00	2.171E-01
Na-22	2.397E-02	0.000E+00	3.000E-05	2.400E-02
Na-24	3.000E-05	0.000E+00	0.000E+00	3.000E-05
Nb-94	4.024E-02	4.590E-01	2.175E-01	7.167E-01
Nb-95	2.988E+01	8.694E+02	1.670E+01	9.160E+02
Nb-97	0.000E+00	6.510E-01	0.000E+00	6.510E-01
Ni-59	8.838E-01	4.505E+00	4.398E+01	4.937E+01
Ni-63	2.649E+02	1.481E+03	6.413E+03	8.159E+03
Ni-65	1.015E+00	0.000E+00	0.000E+00	1.015E+00
Np-237	4.000E-05	4.500E-04	0.000E+00	4.900E-04
Pa-233	1.800E-04	0.000E+00	0.000E+00	1.800E-04
Pa-234	1.350E-03	0.000E+00	0.000E+00	1.350E-03
Pm-147	5.825E+01	1.485E+02	3.174E+02	5.242E+02
Po-210	7.820E-03	5.000E-04	0.000E+00	8.320E-03
Po-218	6.000E-03	0.000E+00	0.000E+00	6.000E-03
Pu-238	6.587E-02	6.987E-02	1.347E-01	2.704E-01
Pu-239	4.355E-02	6.572E-02	1.040E-01	2.132E-01
Pu-240	7.380E-03	9.930E-03	4.061E-02	5.792E-02
Pu-241	1.520E+01	5.869E+00	1.430E+01	3.537E+01
Pu-242	1.165E-02	1.000E-05	1.547E-02	2.713E-02
P-32	3.337E+00	7.400E-04	0.000E+00	3.338E+00
Ra-226	1.921E-01	8.900E-04	4.648E-02	2.394E-01
Rb-86	4.440E-03	0.000E+00	0.000E+00	4.440E-03
Ru-103	2.880E-01	7.434E+01	0.000E+00	7.463E+01
Ru-105	9.464E-02	4.600E-01	0.000E+00	5.546E-01
Ru-106	5.384E+00	4.453E+01	1.477E+01	6.468E+01
Sb-122	4.779E-02	1.083E+01	1.468E+01	2.556E+01
Sb-124	5.497E+00	1.887E+01	3.428E+01	5.865E+01
Sb-125	1.370E+01	2.831E+02	7.641E+02	1.061E+03
Sc-46	1.520E-02	0.000E+00	0.000E+00	1.520E-02
Se-75	5.800E-04	0.000E+00	0.000E+00	5.800E-04
Sn-113	7.658E-01	2.686E+01	4.336E-01	2.805E+01
Sr-85	9.610E-03	0.000E+00	0.000E+00	9.610E-03
Sr-89	4.502E+00	2.981E+02	3.149E+00	3.058E+02
Sr-90	8.664E+00	5.716E+02	2.309E+03	2.890E+03
Sr-92	0.000E+00	1.835E-01	2.870E-01	4.705E-01
S-35	1.856E+00	0.000E+00	0.000E+00	1.856E+00
Ta-182	4.500E-04	0.000E+00	0.000E+00	4.500E-04
Tc-99	2.329E+00	1.158E+00	5.684E+00	9.171E+00
Tc-99m	8.958E-02	0.000E+00	1.586E-01	2.482E-01

Table A-2 (Continued)

Nuclide	Class A	Class B	Class C	Total
Te-125m	5.843E-02	1.609E+00	5.999E+00	7.667E+00
Te-132	7.300E-04	0.000E+00	0.000E+00	7.300E-04
Th-232	4.237E+02	0.000E+00	0.000E+00	4.237E+02
Tl-201	6.800E-04	0.000E+00	0.000E+00	6.800E-04
TRU	4.330E-01	8.400E-02	5.316E-01	1.049E+00
U-234	2.073E+00	6.600E-04	1.800E-04	2.074E+00
U-235	3.342E-01	1.000E-05	0.000E+00	3.342E-01
U-236	1.936E-02	0.000E+00	0.000E+00	1.936E-02
U-238	3.207E+02	3.000E-05	1.100E-04	3.207E+02
U-DEP	1.404E+02	0.000E+00	0.000E+00	1.404E+02
Xe-131	5.812E-02	7.186E-01	0.000E+00	7.767E-01
Xe-131m	2.875E+00	5.807E+00	3.333E-02	8.715E+00
Xe-133	9.312E-01	9.961E-01	0.000E+00	1.927E+00
Xe-133m	1.580E-03	1.424E+00	0.000E+00	1.426E+00
Xe-135	7.980E-03	0.000E+00	0.000E+00	7.980E-03
Y-90	0.000E+00	0.000E+00	3.044E-02	3.044E-02
Y-91	0.000E+00	4.619E+02	0.000E+00	4.619E+02
Zn-65	3.681E+03	1.152E+03	1.996E+02	5.033E+03
Zr-95	1.960E+01	4.688E+02	1.139E+01	4.998E+02
Total	2.124E+04	3.374E+04	1.640E+05	2.190E+05

Table A-3. Barnwell 1989 Radionuclide Distribution (Ci) by Waste Class

Nuclide	Class A	Class B	Class C	Total
Ag-108m	0.000E+00	0.000E+00	8.460E-03	8.460E-03
Ag-110	1.761E+00	0.000E+00	5.046E-02	1.812E+00
Ag-110m	3.769E+01	8.056E+01	2.937E+01	1.476E+02
Am-241	1.085E-01	5.068E-02	2.025E-01	3.616E-01
Am-242	0.000E+00	0.000E+00	2.850E-03	2.850E-03
Am-243	4.000E-05	0.000E+00	0.000E+00	4.000E-05
Au-195	1.290E-03	0.000E+00	0.000E+00	1.290E-03
Au-198	1.004E-02	0.000E+00	0.000E+00	1.004E-02
Ba-131	1.109E-01	0.000E+00	0.000E+00	1.109E-01
Ba-133	9.204E-02	5.200E-04	1.200E-04	9.268E-02
Ba-137m	0.000E+00	0.000E+00	4.137E-01	4.137E-01
Ba-140	1.297E+01	1.023E+00	1.930E+01	3.329E+01
Be-7	2.120E-02	8.760E-01	5.793E+00	6.690E+00
Bi-207	4.770E-03	0.000E+00	0.000E+00	4.770E-03
Bi-210	1.000E-05	0.000E+00	0.000E+00	1.000E-05
Ca-45	1.609E-01	0.000E+00	0.000E+00	1.609E-01
Cd-109	9.300E-02	1.630E-03	7.950E-01	8.896E-01
Ce-139	1.000E-05	0.000E+00	0.000E+00	1.000E-05
Ce-141	7.183E+00	1.311E+02	2.377E+00	1.407E+02
Ce-143	0.000E+00	2.780E+00	0.000E+00	2.780E+00
Ce-144	3.276E+01	8.559E+02	1.784E+01	9.065E+02
Cl-36	2.386E-02	0.000E+00	0.000E+00	2.386E-02
Cm-242	9.841E-02	1.331E+00	1.374E+00	2.804E+00
Cm-243	1.028E-02	3.180E-02	3.670E-03	4.575E-02
Cm-244	3.214E-02	1.448E-01	2.108E-01	3.878E-01
Co-57	2.987E+00	1.912E+01	9.038E+00	3.115E+01
Co-58	8.011E+02	3.456E+03	8.034E+03	1.229E+04
Co-59	0.000E+00	0.000E+00	9.500E-03	9.500E-03
Co-60	3.899E+03	3.204E+04	2.202E+05	2.562E+05
Cr-51	1.152E+03	1.569E+03	4.794E+02	3.201E+03
Cs-134	3.216E+02	1.315E+03	1.460E+03	3.097E+03
Cs-135	4.954E-02	0.000E+00	0.000E+00	4.954E-02
Cs-136	2.825E-01	8.626E+00	0.000E+00	8.909E+00
Cs-137	8.217E+02	2.596E+03	5.237E+03	8.655E+03
Cs-144	3.400E-04	0.000E+00	0.000E+00	3.400E-04
C-14	6.007E+01	2.239E+01	5.225E+01	1.347E+02
Dy-NOS	1.000E-04	0.000E+00	0.000E+00	1.000E-04
Eu-152	1.278E-02	0.000E+00	0.000E+00	1.278E-02
Eu-154	1.090E-02	1.510E-01	1.876E+00	2.038E+00
Eu-155	3.392E-01	0.000E+00	1.153E-01	4.545E-01
Fe-55	4.910E+03	4.979E+03	3.525E+05	3.624E+05

Table A-3 (Continued)

Nuclide	Class A	Class B	Class C	Total
Fe-59	1.224E+02	4.540E+01	1.700E+01	1.848E+02
Ga-67	1.633E-02	0.000E+00	0.000E+00	1.633E-02
Gd-153	4.695E-01	0.000E+00	0.000E+00	4.695E-01
Ge-68	4.913E-02	0.000E+00	0.000E+00	4.913E-02
Hf-175	0.000E+00	0.000E+00	3.380E+02	3.380E+02
Hf-181	2.700E-03	0.000E+00	7.661E+02	7.661E+02
Hg-203	1.070E-03	0.000E+00	0.000E+00	1.070E-03
H-3	5.466E+02	1.125E+04	3.515E+03	1.531E+04
In-111	2.392E-02	0.000E+00	0.000E+00	2.392E-02
In-114	1.100E-03	0.000E+00	0.000E+00	1.100E-03
In-114m	5.460E-03	0.000E+00	0.000E+00	5.460E-03
Ir-192	4.400E-04	3.920E-01	1.000E-05	3.925E-01
I-123	2.000E-05	0.000E+00	0.000E+00	2.000E-05
I-125	2.696E+01	1.070E-03	2.600E-02	2.699E+01
I-126	1.000E-05	0.000E+00	0.000E+00	1.000E-05
I-129	3.962E-01	1.880E-02	6.294E-02	4.779E-01
I-131	8.722E+01	1.782E+02	4.033E+00	2.694E+02
I-133	1.512E-01	0.000E+00	2.488E+00	2.639E+00
I-134	4.860E-01	0.000E+00	0.000E+00	4.860E-01
Kr-85	8.484E+01	4.532E-02	4.263E+00	8.915E+01
K-40	1.800E-04	0.000E+00	0.000E+00	1.800E-04
La-140	5.925E+00	1.842E+00	1.166E+00	8.934E+00
Mn-54	1.145E+03	1.122E+03	1.924E+04	2.151E+04
Mo-99	1.208E-01	0.000E+00	0.000E+00	1.208E-01
Na-22	1.361E-01	0.000E+00	0.000E+00	1.361E-01
Na-24	1.883E-02	0.000E+00	0.000E+00	1.883E-02
Nb-93	3.200E-04	0.000E+00	0.000E+00	3.200E-04
Nb-94	3.059E-01	3.383E-02	1.680E-01	5.078E-01
Nb-95	1.091E+02	9.947E+02	2.759E+01	1.131E+03
Nd-147	9.000E-05	0.000E+00	0.000E+00	9.000E-05
Nd-NOS	2.368E-02	0.000E+00	0.000E+00	2.368E-02
Ni-59	2.275E+00	8.528E+00	4.825E+01	5.905E+01
Ni-63	4.299E+02	1.920E+03	2.407E+04	2.642E+04
Np-237	1.030E-03	0.000E+00	0.000E+00	1.030E-03
Np-239	8.958E-02	0.000E+00	0.000E+00	8.958E-02
Pa-233	1.400E-04	0.000E+00	0.000E+00	1.400E-04
Pb-210	3.700E-04	0.000E+00	1.800E-01	1.804E-01
Pm-147	4.923E+01	1.919E+02	4.400E+02	6.811E+02
Po-210	2.855E-02	2.900E-03	5.000E-04	3.195E-02
Pr-144	0.000E+00	8.310E-03	3.610E-03	1.192E-02
Pu-238	7.671E-02	3.797E-02	1.274E-01	2.420E-01
Pu-239	1.634E-01	3.771E-02	2.427E-01	4.437E-01
Pu-240	1.469E-02	2.840E-03	5.068E-02	6.821E-02
Pu-241	1.122E+01	3.433E+00	1.357E+01	2.822E+01
Pu-242	1.013E-02	3.000E-05	1.860E-02	2.876E-02
P-32	9.370E+00	1.137E+01	0.000E+00	2.074E+01
Ra-226	7.757E-01	1.680E-03	5.800E-04	7.780E-01

Table A-3 (Continued)

Nuclide	Class A	Class B	Class C	Total
Rb-86	1.435E-02	0.000E+00	0.000E+00	1.435E-02
Rh-103	5.400E-04	0.000E+00	0.000E+00	5.400E-04
Rh-105	4.602E-01	0.000E+00	1.761E+00	2.221E+00
Rh-106	7.380E-03	0.000E+00	0.000E+00	7.380E-03
Ru-103	4.608E+00	8.646E+01	4.777E+01	1.388E+02
Ru-106	4.185E+00	3.909E+01	2.814E+01	7.142E+01
Sb-122	7.354E-01	4.693E+00	1.818E+01	2.361E+01
Sb-124	1.176E+01	1.055E+01	5.069E-01	2.281E+01
Sb-125	3.138E+02	7.476E+01	1.246E+03	1.634E+03
Sc-46	7.252E-02	0.000E+00	0.000E+00	7.252E-02
Se-75	3.826E-02	7.401E-02	9.900E-02	2.113E-01
Sn-113	1.220E+00	1.834E+00	3.668E+00	6.723E+00
Sn-117m	3.060E-03	0.000E+00	0.000E+00	3.060E-03
Sr-85	6.971E-02	0.000E+00	0.000E+00	6.971E-02
Sr-89	2.793E+01	3.635E+02	8.838E+00	4.003E+02
Sr-90	1.290E+01	1.270E+02	1.910E+03	2.050E+03
S-35	8.173E+00	0.000E+00	0.000E+00	8.173E+00
Ta-182	0.000E+00	3.500E+01	2.909E-01	3.529E+01
Tc-99	3.589E+00	6.239E-01	3.859E+00	8.072E+00
Tc-99m	4.178E-02	0.000E+00	0.000E+00	4.178E-02
Te-125m	1.140E-01	2.000E+00	4.734E+01	4.945E+01
Te-129m	1.000E-05	0.000E+00	0.000E+00	1.000E-05
Te-132	0.000E+00	0.000E+00	3.542E-02	3.542E-02
Te-204	1.000E-03	0.000E+00	0.000E+00	1.000E-03
Th-228	7.000E-05	0.000E+00	0.000E+00	7.000E-05
Th-230	0.000E+00	1.000E-05	0.000E+00	1.000E-05
Th-232	2.801E+02	1.000E-04	9.700E-04	2.801E+02
Tl-201	1.393E-02	0.000E+00	0.000E+00	1.393E-02
Tl-204	1.175E-01	0.000E+00	0.000E+00	1.175E-01
TRU-NOS	1.403E-01	6.080E-03	4.079E-02	1.871E-01
U-234	3.095E+00	1.400E-04	7.830E-03	3.103E+00
U-235	3.108E+00	0.000E+00	6.000E-05	3.108E+00
U-236	1.082E-01	0.000E+00	0.000E+00	1.082E-01
U-237	1.070E-03	0.000E+00	0.000E+00	1.070E-03
U-238	2.903E+02	3.070E-02	1.100E-03	2.904E+02
U-DEP	1.189E+02	4.279E-01	0.000E+00	1.193E+02
Xe-131m	1.311E+01	5.339E+00	0.000E+00	1.845E+01
Xe-133	1.051E+00	0.000E+00	0.000E+00	1.051E+00
Xe-135	8.368E-02	0.000E+00	0.000E+00	8.368E-02
Yb-169	3.700E-04	0.000E+00	0.000E+00	3.700E-04
Y-88	7.060E-03	0.000E+00	0.000E+00	7.060E-03
Y-90	7.300E-04	0.000E+00	3.822E-02	3.895E-02
Y-91	1.805E+01	5.609E+02	0.000E+00	5.789E+02
Zn-65	2.041E+03	2.744E+03	1.449E+01	4.799E+03
Zr-95	2.930E+01	5.516E+02	1.235E+01	5.932E+02
Total	1.788E+04	6.742E+04	6.399E+05	7.252E+05

Table A-4. Richland 1987 Radionuclide Distribution (Ci) by Waste Class

Nuclide	Class A	Class B	Class C	Total
Ac-227	1.000E-06	0.000E+00	0.000E+00	1.000E-06
Ac-228	5.200E-05	0.000E+00	0.000E+00	5.200E-05
Ag-110m	1.300E+01	4.781E+00	1.432E+00	1.921E+01
Am-241	8.207E-02	1.606E-02	1.240E-01	2.221E-01
Am-243	3.400E-05	0.000E+00	1.000E-06	3.500E-05
Am-244	8.000E-06	0.000E+00	0.000E+00	8.000E-06
Au-193	2.020E-04	0.000E+00	0.000E+00	2.020E-04
Au-195	4.176E-02	0.000E+00	0.000E+00	4.176E-02
Ba-133	1.186E-01	0.000E+00	0.000E+00	1.186E-01
Ba-140	1.175E+00	4.651E+00	3.723E-01	6.199E+00
Be-7	8.948E-03	9.348E+00	0.000E+00	9.357E+00
Bi-207	5.143E-03	0.000E+00	0.000E+00	5.143E-03
Bi-210	3.000E-06	0.000E+00	0.000E+00	3.000E-06
Br-82	4.000E-06	0.000E+00	0.000E+00	4.000E-06
C-14	9.694E+01	1.075E+00	8.546E+00	1.066E+02
Ca-45	8.366E-01	0.000E+00	0.000E+00	8.366E-01
Ca-47	1.140E-04	0.000E+00	0.000E+00	1.140E-04
Cd-109	8.536E+00	0.000E+00	0.000E+00	8.536E+00
Cd-115	1.000E-04	0.000E+00	0.000E+00	1.000E-04
Ce-139	1.700E-05	0.000E+00	0.000E+00	1.700E-05
Ce-141	2.026E-01	5.165E-01	0.000E+00	7.191E-01
Ce-144	3.038E+00	6.400E-01	7.724E-01	4.450E+00
Cf-36	1.518E-01	0.000E+00	0.000E+00	1.518E-01
Cm-242	2.898E-02	4.810E-02	3.418E-02	1.113E-01
Cm-243	2.390E-03	1.983E-02	1.620E-04	2.238E-02
Cm-244	6.752E-03	5.216E-03	4.970E-04	1.247E-02
Co-57	3.322E+00	3.312E+00	0.000E+00	6.634E+00
Co-58	1.035E+02	8.728E+02	9.031E+01	1.067E+03
Co-59	5.000E-03	0.000E+00	0.000E+00	5.000E-03
Co-60	3.449E+02	3.267E+02	6.599E+03	7.270E+03
Cr-51	8.433E+01	1.205E+02	6.570E+00	2.114E+02
Cs-131	1.730E-03	0.000E+00	0.000E+00	1.730E-03
Cs-133	5.000E-03	0.000E+00	0.000E+00	5.000E-03
Cs-134	2.264E+01	3.442E+02	3.647E+01	4.033E+02
Cs-136	4.791E-02	0.000E+00	0.000E+00	4.791E-02
Cs-137	7.499E+01	8.081E+02	1.983E+02	1.081E+03
Cu-64	2.000E-06	0.000E+00	0.000E+00	2.000E-06
Cu-67	1.567E-03	0.000E+00	0.000E+00	1.567E-03
Eu-152	2.908E-02	0.000E+00	0.000E+00	2.908E-02
Eu-154	4.681E-03	0.000E+00	0.000E+00	4.681E-03
Eu-155	4.262E-02	9.060E-03	4.260E-02	9.428E-02
Fe-55	1.677E+02	3.196E+02	4.603E+03	5.090E+03
Fe-59	2.172E+00	9.536E+00	0.000E+00	1.171E+01
Ga-67	6.663E-02	0.000E+00	0.000E+00	6.663E-02
Ga-68	2.700E-04	0.000E+00	0.000E+00	2.700E-04
Gd-153	1.368E-01	0.000E+00	0.000E+00	1.368E-01

Table A-4 (Continued)

Nuclide	Class A	Class B	Class C	Total
Gd-159	3.000E-05	0.000E+00	0.000E+00	3.000E-05
Ge-68	3.452E-02	0.000E+00	0.000E+00	3.452E-02
H-3	1.911E+03	2.699E+04	8.514E+02	2.975E+04
Hf-181	1.738E-01	0.000E+00	0.000E+00	1.738E-01
Hg-203	8.180E-03	0.000E+00	0.000E+00	8.180E-03
I-123	1.970E-01	0.000E+00	0.000E+00	1.970E-01
I-124	2.200E-05	0.000E+00	0.000E+00	2.200E-05
I-125	4.674E+01	0.000E+00	0.000E+00	4.674E+01
I-129	1.876E-01	2.280E-02	9.870E-02	3.091E-01
I-131	3.747E+00	1.986E+01	0.000E+00	2.361E+01
I-132	8.000E-04	0.000E+00	0.000E+00	8.000E-04
I-133	1.013E-01	2.930E-03	0.000E+00	1.043E-01
I-135	1.140E-03	0.000E+00	0.000E+00	1.140E-03
In-111	3.105E-01	0.000E+00	0.000E+00	3.105E-01
In-113m	2.000E-06	0.000E+00	0.000E+00	2.000E-06
In-114	6.600E-05	0.000E+00	0.000E+00	6.600E-05
In-114m	7.491E-03	0.000E+00	0.000E+00	7.491E-03
Ir-192	3.436E-01	0.000E+00	0.000E+00	3.436E-01
K-40	1.600E-05	0.000E+00	0.000E+00	1.600E-05
K-42	1.065E-03	0.000E+00	0.000E+00	1.065E-03
Kr-85	9.522E+00	0.000E+00	0.000E+00	9.522E+00
La-140	1.677E+00	6.125E+00	0.000E+00	7.802E+00
Mn-54	6.049E+01	1.165E+02	3.153E+02	4.923E+02
Mo-99	1.063E-01	0.000E+00	0.000E+00	1.063E-01
Na-22	5.102E-01	0.000E+00	0.000E+00	5.102E-01
Na-24	1.001E-02	0.000E+00	0.000E+00	1.001E-02
Nb-94	1.000E-05	0.000E+00	6.440E-04	6.540E-04
Nb-95	4.616E+01	2.841E-01	1.619E+00	4.807E+01
Nb-97	1.055E-02	0.000E+00	0.000E+00	1.055E-02
Nd-147	4.200E-05	0.000E+00	0.000E+00	4.200E-05
Ni-59	4.740E+00	1.163E-01	5.140E+00	9.996E+00
Ni-63	4.131E+01	1.265E+02	1.700E+02	3.377E+02
Ni-63AM	0.000E+00	0.000E+00	1.676E+02	1.676E+02
Ni-65	6.640E-03	0.000E+00	0.000E+00	6.640E-03
Np-237	1.433E-03	0.000E+00	3.100E-05	1.464E-03
P-32	8.268E+01	0.000E+00	0.000E+00	8.268E+01
P-33	1.774E-02	0.000E+00	0.000E+00	1.774E-02
Pa-233	8.000E-06	0.000E+00	0.000E+00	8.000E-06
Pb-203	1.500E-05	0.000E+00	0.000E+00	1.500E-05
Pb-210	2.783E-02	0.000E+00	0.000E+00	2.783E-02
Pb-212	5.900E-05	0.000E+00	0.000E+00	5.900E-05
Pb-214	2.100E-04	0.000E+00	0.000E+00	2.100E-04
Pm-143	1.000E-06	0.000E+00	0.000E+00	1.000E-06
Pm-147	1.997E+01	2.049E-01	5.595E-01	2.073E+01
Po-209	1.100E-05	0.000E+00	0.000E+00	1.100E-05
Po-210	4.717E-02	0.000E+00	0.000E+00	4.717E-02
Pr-143	4.100E-05	0.000E+00	0.000E+00	4.100E-05
Pt-195	4.000E-03	0.000E+00	0.000E+00	4.000E-03

Table A-4 (Continued)

Nuclide	Class A	Class B	Class C	Total
Pu-238	2.273E-02	2.657E-02	3.526E-03	5.282E-02
Pu-239	7.294E-02	2.667E-02	2.924E-02	1.288E-01
Pu-240	2.296E-02	1.260E-03	1.388E-02	3.811E-02
Pu-241	2.912E+00	1.543E+00	1.380E+00	5.835E+00
Pu-242	1.757E-03	0.000E+00	3.100E-05	1.788E-03
Ra-226	3.050E-01	1.505E-03	2.688E+00	2.994E+00
Rb-83	1.900E-02	0.000E+00	0.000E+00	1.900E-02
Rb-86	9.186E-02	0.000E+00	0.000E+00	9.186E-02
Re-184	2.000E-05	0.000E+00	0.000E+00	2.000E-05
Ru-103	1.731E-01	2.760E-04	9.420E-01	1.115E+00
Ru-106	2.196E+00	4.041E-02	1.578E-01	2.394E+00
S-35	8.164E+01	0.000E+00	0.000E+00	8.164E+01
Sb-122	5.700E-05	0.000E+00	0.000E+00	5.700E-05
Sb-124	8.657E+01	6.476E+01	0.000E+00	1.513E+02
Sb-125	4.048E+01	6.145E+00	6.160E-01	4.724E+01
Sc-46	9.517E-02	0.000E+00	0.000E+00	9.517E-02
Sc-47	3.000E-06	0.000E+00	0.000E+00	3.000E-06
Se-75	7.035E-02	0.000E+00	0.000E+00	7.035E-02
Si-32	5.000E-06	0.000E+00	0.000E+00	5.000E-06
Sn-113	1.832E+00	1.525E+00	0.000E+00	3.357E+00
Sn-119	1.613E-02	0.000E+00	0.000E+00	1.613E-02
Sr-85	5.919E-02	0.000E+00	0.000E+00	5.919E-02
Sr-89	5.063E-01	9.475E+00	3.000E-01	1.028E+01
Sr-90	1.827E+01	2.848E+01	6.629E+00	5.338E+01
Sr-91	2.311E-02	0.000E+00	0.000E+00	2.311E-02
Sr-92	5.767E-02	0.000E+00	0.000E+00	5.767E-02
Sr-95	5.660E-04	0.000E+00	0.000E+00	5.660E-04
Ta-182	4.282E-03	0.000E+00	0.000E+00	4.282E-03
Tb-158	3.700E-05	0.000E+00	0.000E+00	3.700E-05
Tb-160	1.000E-06	0.000E+00	0.000E+00	1.000E-06
Tc-99	5.526E-01	4.239E-02	1.333E-01	7.282E-01
Tc-99m	2.853E-01	0.000E+00	0.000E+00	2.853E-01
Te-123m	2.800E-02	0.000E+00	0.000E+00	2.800E-02
Te-125m	9.133E+00	6.400E-01	2.670E-02	9.799E+00
Te-127m	4.200E-05	0.000E+00	0.000E+00	4.200E-05
Te-129m	4.200E-05	0.000E+00	0.000E+00	4.200E-05
Th-228	2.320E-04	0.000E+00	0.000E+00	2.320E-04
Th-229	4.000E-06	0.000E+00	0.000E+00	4.000E-06
Th-230	1.400E-04	0.000E+00	0.000E+00	1.400E-04
Th-232	7.452E-02	0.000E+00	0.000E+00	7.452E-02
Th-NAT	1.035E+01	0.000E+00	0.000E+00	1.035E+01
Tl-201	7.440E-02	0.000E+00	0.000E+00	7.440E-02
Tl-202	2.234E-03	0.000E+00	0.000E+00	2.234E-03
Tl-204	8.710E-03	0.000E+00	0.000E+00	8.710E-03
Tl-208	7.700E-05	0.000E+00	0.000E+00	7.700E-05
U-232	0.000E+00	0.000E+00	2.000E-06	2.000E-06
U-233	0.000E+00	0.000E+00	2.000E-06	2.000E-06
U-234	2.009E-02	5.800E-05	6.440E-04	2.079E-02

Table A-4 (Continued)

<u>Nuclide</u>	<u>Class A</u>	<u>Class B</u>	<u>Class C</u>	<u>Total</u>
U-235	6.593E-02	8.000E-06	3.500E-05	6.597E-02
U-236	7.800E-05	0.000E+00	2.000E-06	8.000E-05
U-238	2.858E+01	1.800E-05	1.280E-04	2.858E+01
U-DEP	0.000E+00	0.000E+00	0.000E+00	0.000E+00
U-NAT	2.850E+00	0.000E+00	0.000E+00	2.850E+00
Xe-127	4.688E-03	0.000E+00	0.000E+00	4.688E-03
Xe-131m	4.331E-03	0.000E+00	0.000E+00	4.331E-03
Xe-133	1.104E-01	0.000E+00	0.000E+00	1.104E-01
Y-88	4.060E-04	0.000E+00	0.000E+00	4.060E-04
Y-90	2.792E-02	0.000E+00	0.000E+00	2.792E-02
Y-91	4.300E-05	0.000E+00	0.000E+00	4.300E-05
Yb-169	7.917E-03	0.000E+00	0.000E+00	7.917E-03
Zn-65	7.152E+02	3.260E+01	0.000E+00	7.478E+02
Zr-88	5.000E-03	0.000E+00	0.000E+00	5.000E-03
Zr-89	1.010E-02	0.000E+00	0.000E+00	1.010E-02
Zr-95	2.572E+01	2.093E-01	6.350E-01	2.656E+01
Zr-97	1.545E-03	0.000E+00	0.000E+00	1.545E-03
Total	4.187E+03	3.023E+04	1.307E+04	4.748E+04

Table A-5. Richland 1988 Radionuclide Distribution (Ci) by Waste Class

<u>Nuclide</u>	<u>Class A</u>	<u>Class B</u>	<u>Class C</u>	<u>Total</u>
Ag-108	1.000E-06	0.000E+00	0.000E+00	1.000E-06
Ag-108m	1.012E-02	0.000E+00	0.000E+00	1.012E-02
Ag-110	3.080E-04	0.000E+00	0.000E+00	8.080E-04
Ag-110m	2.116E+01	4.892E+01	3.693E+01	1.070E+02
Am-241	1.709E-01	3.551E-03	9.833E-02	2.728E-01
Am-247	7.300E-05	0.000E+00	0.000E+00	7.300E-05
As-73	9.090E-04	0.000E+00	0.000E+00	9.090E-04
Au-195	1.425E-03	0.000E+00	0.000E+00	1.425E-03
Ba-133	3.561E-02	0.000E+00	0.000E+00	3.561E-02
Ba-140	4.005E-01	5.000E-06	0.000E+00	4.005E-01
Be-7	1.415E-02	0.000E+00	2.079E-01	2.220E-01
Bi-205	2.000E-06	0.000E+00	0.000E+00	2.000E-06
Bi-207	4.570E-04	0.000E+00	0.000E+00	4.570E-04
Bi-210	1.400E-05	0.000E+00	0.000E+00	1.400E-05
C-14	8.349E+01	1.497E+00	5.107E+00	9.009E+01
Ca-45	1.204E+00	0.000E+00	0.000E+00	1.204E+00
Ca-47	2.620E-04	0.000E+00	0.000E+00	2.620E-04
Cd-107	1.100E-05	0.000E+00	0.000E+00	1.100E-05
Cd-109	2.339E-01	0.000E+00	0.000E+00	2.339E-01
Cd-115	1.000E-06	0.000E+00	0.000E+00	1.000E-06
Ce-139	6.300E-05	0.000E+00	0.000E+00	6.300E-05
Ce-141	5.620E-01	0.000E+00	2.666E-02	5.887E-01
Ce-144	2.192E+00	1.452E+00	4.618E+00	8.262E+00
Cf-252	8.460E-04	0.000E+00	0.000E+00	8.460E-04
Cl-36	3.254E-01	0.000E+00	0.000E+00	3.254E-01
Cm-242	2.314E-02	1.462E-03	4.556E-03	2.916E-02
Cm-243	3.850E-04	8.000E-06	6.000E-06	3.990E-04
Cm-244	1.896E-03	6.620E-04	1.542E-03	4.100E-03
Co-56	7.950E-04	0.000E+00	0.000E+00	7.950E-04
Co-57	2.015E+00	7.797E-01	4.280E-01	3.223E+00
Co-58	1.057E+02	1.448E+02	1.079E+02	3.583E+02
Co-60	3.908E+02	1.806E+02	1.973E+02	7.687E+02
Cr-51	1.290E+02	2.507E+00	8.064E+00	1.396E+02
Cs-134	3.248E+01	2.951E+02	7.748E+02	1.102E+03
Cs-136	3.532E-02	5.000E-06	0.000E+00	3.533E-02
Cs-137	6.062E+01	5.465E+02	2.148E+03	2.755E+03
Cs-144	2.469E-03	0.000E+00	0.000E+00	2.469E-03
Cu-64	1.100E-05	0.000E+00	0.000E+00	1.100E-05
Cu-67	1.600E-05	0.000E+00	0.000E+00	1.600E-05
Dy-165	1.000E-04	0.000E+00	0.000E+00	1.000E-04
Eu-152	1.014E-01	0.000E+00	0.000E+00	1.014E-01
Eu-154	1.961E-02	0.000E+00	0.000E+00	1.961E-02

Table A-5 (Continued)

Nuclide	Class A	Class B	Class C	Total
Eu-155	4.344E-02	4.510E-03	1.043E-01	1.522E-01
Fe-55	3.287E+02	2.754E+02	2.254E+02	8.294E+02
Fe-59	7.912E+00	4.440E-02	4.019E-01	8.358E+00
Ga-67	6.697E-02	0.000E+00	0.000E+00	6.697E-02
Ga-68	1.013E-03	0.000E+00	0.000E+00	1.013E-03
Gd-153	1.510E-01	0.000E+00	0.000E+00	1.510E-01
Ge-68	2.493E-02	0.000E+00	0.000E+00	2.493E-02
H-3	2.396E+03	2.083E+04	2.215E+00	2.323E+04
Hf-181	5.997E-02	4.760E-03	0.000E+00	6.473E-02
Hg-203	1.025E-02	0.000E+00	0.000E+00	1.025E-02
I-121	4.000E-06	0.000E+00	0.000E+00	4.000E-06
I-123	3.206E-02	0.000E+00	0.000E+00	3.206E-02
I-125	4.137E+01	0.000E+00	0.000E+00	4.137E+01
I-126	5.000E-06	0.000E+00	0.000E+00	5.000E-06
I-129	2.932E-02	3.054E-03	1.803E-02	5.040E-02
I-131	2.664E+00	6.657E+00	3.520E+00	1.284E+01
I-133	2.000E-03	0.000E+00	0.000E+00	2.000E-03
I-137	4.000E-04	0.000E+00	0.000E+00	4.000E-04
In-111	1.560E-01	0.000E+00	0.000E+00	1.560E-01
In-113	8.000E-06	0.000E+00	0.000E+00	8.000E-06
In-114	2.996E-03	0.000E+00	0.000E+00	2.996E-03
In-114m	1.679E-03	0.000E+00	0.000E+00	1.679E-03
Ir-192	9.779E-02	0.000E+00	0.000E+00	9.779E-02
K-40	8.500E-05	0.000E+00	0.000E+00	8.500E-05
K-42	1.000E-06	0.000E+00	0.000E+00	1.000E-06
Kr-85	5.292E+00	0.000E+00	0.000E+00	5.292E+00
La-140	5.002E-01	6.000E-06	5.920E-01	1.092E+00
Mn-54	8.833E+01	3.557E+01	4.954E+01	1.734E+02
Mn-57	1.000E-06	0.000E+00	0.000E+00	1.000E-06
Mo-99	7.773E-03	0.000E+00	0.000E+00	7.773E-03
Na-22	6.055E-01	0.000E+00	0.000E+00	6.055E-01
Na-24	3.413E-02	0.000E+00	0.000E+00	3.413E-02
Nb-88	1.000E-05	0.000E+00	0.000E+00	1.000E-05
Nb-93	4.000E-06	0.000E+00	0.000E+00	4.000E-06
Nb-94	3.960E-03	0.000E+00	0.000E+00	3.960E-03
Nb-95	1.944E+01	5.383E+00	5.413E+00	3.024E+01
Ni-59	5.679E-02	2.170E-01	3.485E-02	3.086E-01
Ni-63	3.103E+01	5.994E+01	1.650E+02	2.559E+02
P-32	7.304E+01	0.000E+00	0.000E+00	7.304E+01
P-33	4.681E-03	0.000E+00	0.000E+00	4.681E-03
Pa-233	7.000E-06	0.000E+00	0.000E+00	7.000E-06
Pa-234	1.000E-06	0.000E+00	0.000E+00	1.000E-06
Pb-203	2.000E-06	0.000E+00	0.000E+00	2.000E-06

Table A-5 (Continued)

Nuclide	Class A	Class B	Class C	Total
Pb-210	1.898E-02	0.000E+00	0.000E+00	1.898E-02
Pb-212	2.000E-06	0.000E+00	0.000E+00	2.000E-06
Pm-145	1.000E-06	0.000E+00	0.000E+00	1.000E-06
Pm-147	6.654E+00	1.627E-01	1.533E+02	1.601E+02
Po-208	1.000E-06	0.000E+00	0.000E+00	1.000E-06
Po-210	7.878E-01	0.000E+00	0.000E+00	7.878E-01
Pt-193	1.000E-06	0.000E+00	0.000E+00	1.000E-06
Pu-236	1.000E-05	0.000E+00	0.000E+00	1.000E-05
Pu-238	8.981E-03	1.307E-03	1.323E-02	2.352E-02
Pu-239	2.899E-02	4.814E-03	7.914E-02	1.129E-01
Pu-240	8.445E-03	1.140E-03	2.211E-02	3.169E-02
Pu-241	8.478E-01	2.209E-01	2.440E+00	3.508E+00
Pu-242	6.370E-04	1.900E-03	1.500E-05	2.552E-03
Ra-224	1.000E-05	0.000E+00	0.000E+00	1.000E-05
Ra-226	1.689E-01	1.600E-05	5.754E-01	7.443E-01
Ra-228	1.400E-05	0.000E+00	0.000E+00	1.400E-05
Rb-83	1.836E-02	0.000E+00	0.000E+00	1.836E-02
Rb-86	1.245E-01	0.000E+00	0.000E+00	1.245E-01
Re-187	1.000E-06	0.000E+00	0.000E+00	1.000E-06
Rh-106	1.300E-04	0.000E+00	0.000E+00	1.300E-04
Ru-103	4.965E-02	8.000E-06	8.230E-04	5.048E-02
Ru-106	1.285E+00	1.844E-02	7.861E+00	9.165E+00
S-35	1.009E+02	0.000E+00	0.000E+00	1.009E+02
Sb-122	4.570E-04	0.000E+00	0.000E+00	4.570E-04
Sb-124	1.276E+01	6.931E+01	1.130E+00	8.320E+01
Sb-125	1.758E+01	4.961E+00	5.725E+00	2.826E+01
Sc-46	1.416E-01	0.000E+00	0.000E+00	1.416E-01
Sc-47	5.000E-06	0.000E+00	0.000E+00	5.000E-06
Sc-50	1.000E-06	0.000E+00	0.000E+00	1.000E-06
Se-75	2.888E-02	0.000E+00	0.000E+00	2.888E-02
Sm-145	1.000E-06	0.000E+00	0.000E+00	1.000E-06
Sn-113	7.326E-01	6.708E-01	2.562E-02	1.429E+00
Sn-119	4.501E-03	0.000E+00	0.000E+00	4.501E-03
Sn-119m	1.859E-01	0.000E+00	0.000E+00	1.859E-01
Sr-81	1.000E-06	0.000E+00	0.000E+00	1.000E-06
Sr-85	6.044E-02	0.000E+00	0.000E+00	6.044E-02
Sr-89	1.186E-01	5.531E-01	2.381E+00	3.053E+00
Sr-90	1.320E+01	3.480E+02	7.146E+02	1.076E+03
Sr-92	5.420E-03	0.000E+00	0.000E+00	5.420E-03
Ta-182	1.567E-03	0.000E+00	0.000E+00	1.567E-03
Tc-99	6.227E-01	2.442E-02	4.251E-01	1.072E+00
Tc-99m	1.467E+00	0.000E+00	0.000E+00	1.467E+00
Te-123	1.602E-02	0.000E+00	0.000E+00	1.602E-02
Te-123m	4.000E-02	0.000E+00	0.000E+00	4.000E-02
Te-125	4.954E-03	0.000E+00	0.000E+00	4.954E-03
Te-125m	4.528E+00	7.171E-01	8.200E-01	6.065E+00

Table A-5 (Continued)

Nuclide	Class A	Class B	Class C	Total
Th-228	8.920E-04	0.000E+00	0.000E+00	8.920E-04
Th-229	1.000E-05	0.000E+00	0.000E+00	1.000E-05
Th-230	4.300E-05	1.000E-06	0.000E+00	4.400E-05
Th-232	5.014E-01	0.000E+00	0.000E+00	5.014E-01
Th-NAT	2.150E+01	0.000E+00	0.000E+00	2.150E+01
Tl-201	3.845E-01	0.000E+00	0.000E+00	3.845E-01
Tl-202	3.120E-03	0.000E+00	0.000E+00	3.120E-03
Tl-204	5.584E-03	0.000E+00	0.000E+00	5.584E-03
Tl-208	4.000E-06	0.000E+00	0.000E+00	4.000E-06
Tl-210	2.000E-06	0.000E+00	0.000E+00	2.000E-06
U-232	4.010E-04	0.000E+00	0.000E+00	4.010E-04
U-233	3.000E-06	0.000E+00	0.000E+00	3.000E-06
U-234	7.820E-04	2.200E-05	7.140E-04	1.518E-03
U-235	6.345E-02	1.100E-05	4.605E-03	6.807E-02
U-236	2.000E-06	0.000E+00	0.000E+00	2.000E-06
U-238	1.396E+01	1.500E-05	2.310E-04	1.396E+01
U-NAT	3.297E+00	0.000E+00	0.000E+00	3.297E+00
W-181	1.000E-06	0.000E+00	0.000E+00	1.000E-06
W-188	1.000E-06	0.000E+00	0.000E+00	1.000E-06
Xe-127	1.326E-02	0.000E+00	0.000E+00	1.326E-02
Xe-131	8.160E-02	3.900E-05	0.000E+00	8.164E-02
Xe-131m	1.822E-02	1.520E-04	1.410E-02	3.248E-02
Xe-133	8.227E-01	0.000E+00	0.000E+00	8.227E-01
Y-88	3.367E-03	0.000E+00	0.000E+00	3.367E-03
Y-90	1.505E-02	0.000E+00	0.000E+00	1.505E-02
Yb-169	2.890E-04	0.000E+00	0.000E+00	2.890E-04
Zn-65	4.087E+02	1.286E+02	3.022E-02	5.374E+02
Zr-85	1.000E-06	0.000E+00	0.000E+00	1.000E-06
Zr-89	5.000E-03	0.000E+00	0.000E+00	5.000E-03
Zr-95	1.171E+01	2.653E+00	2.791E+00	1.715E+01
Zr-97	6.000E-05	0.000E+00	0.000E+00	6.000E-05
Total	4.450E+03	2.299E+04	4.628E+03	3.207E+04

Table A-6. Richland 1989 Radionuclide Distribution (Ci) by Waste Class

Nuclide	Class A	Class B	Class C	Total
Ag-105	2.000E-06	0.000E+00	0.000E+00	2.000E-06
Ag-108m	0.000E+00	0.000E+00	1.000E-03	1.000E-03
Ag-110	1.410E+00	0.000E+00	0.000E+00	1.410E+00
Ag-110m	8.380E+00	1.790E-01	8.519E+00	1.708E+01
Am-241	3.367E-02	9.560E-04	6.701E-02	1.016E-01
Am-243	7.100E-05	0.000E+00	0.000E+00	7.100E-05
As-73	5.300E-04	0.000E+00	0.000E+00	5.300E-04
Au-195	7.280E-03	0.000E+00	0.000E+00	7.280E-03
Ba-133	3.297E-02	0.000E+00	0.000E+00	3.297E-02
Ba-140	2.512E-01	2.960E-01	1.290E-02	5.601E-01
Be-7	1.810E+00	0.000E+00	2.915E-01	2.101E+00
Bi-204	5.000E-03	0.000E+00	0.000E+00	5.000E-03
Bi-205	1.400E-05	0.000E+00	0.000E+00	1.400E-05
Bi-206	2.500E-05	0.000E+00	0.000E+00	2.500E-05
Bi-207	1.112E-03	0.000E+00	0.000E+00	1.112E-03
Bi-210	3.400E-05	0.000E+00	0.000E+00	3.400E-05
Br-82	2.000E-06	0.000E+00	0.000E+00	2.000E-06
C-14	1.309E+02	2.203E+00	7.789E+01	2.110E+02
C-15	6.000E-05	0.000E+00	0.000E+00	6.000E-05
Ca-45	2.289E+00	0.000E+00	0.000E+00	2.289E+00
Ca-47	1.950E-04	0.000E+00	0.000E+00	1.950E-04
Cd-109	3.161E-01	0.000E+00	0.000E+00	3.161E-01
Cd-113m	1.113E-01	0.000E+00	0.000E+00	1.113E-01
Cd-115	1.400E-05	0.000E+00	0.000E+00	1.400E-05
Ce-134	7.600E-05	0.000E+00	0.000E+00	7.600E-05
Ce-137	2.793E-03	0.000E+00	0.000E+00	2.793E-03
Ce-139	2.520E-04	0.000E+00	0.000E+00	2.520E-04
Ce-141	5.406E-01	2.500E-03	6.510E-02	6.082E-01
Ce-144	1.897E+00	3.062E-02	1.492E+01	1.685E+01
Ce-147	1.700E-04	0.000E+00	0.000E+00	1.700E-04
Cf-252	9.000E-06	0.000E+00	0.000E+00	9.000E-06
Ct-36	2.642E-01	0.000E+00	0.000E+00	2.642E-01
Cm-241	2.100E-05	0.000E+00	0.000E+00	2.100E-05
Cm-242	6.939E-03	3.618E-02	4.616E-02	8.928E-02
Cm-243	1.128E-03	3.100E-05	4.598E-03	5.757E-03
Cm-244	1.888E-03	1.067E-03	4.900E-05	3.004E-03
Co-56	1.093E-03	0.000E+00	0.000E+00	1.093E-03
Co-57	1.939E+00	1.669E+00	2.121E+00	5.729E+00
Co-58	1.023E+02	1.683E+02	1.728E+02	4.434E+02
Co-60	6.564E+02	3.817E+02	7.456E+03	8.494E+03
Cr-51	5.349E+02	3.026E+01	4.400E+02	1.005E+03
Cr-56	7.000E-06	0.000E+00	0.000E+00	7.000E-06
Cs-127	2.064E-02	0.000E+00	0.000E+00	2.064E-02
Cs-134	2.842E+01	8.008E+02	2.028E+02	1.032E+03
Cs-136	3.019E-01	2.650E-01	1.169E-02	5.785E-01

Table A-6 (Continued)

Nuclide	Class A	Class B	Class C	Total
Cs-137	5.002E+01	1.478E+03	3.209E+03	4.738E+03
Cs-139	1.000E-06	0.000E+00	0.000E+00	1.000E-06
Cs-141	1.000E-06	0.000E+00	0.000E+00	1.000E-06
Cs-144	1.569E-03	0.000E+00	2.930E-03	4.499E-03
Cu-64	7.000E-06	0.000E+00	0.000E+00	7.000E-06
Cu-67	3.206E-03	0.000E+00	0.000E+00	3.206E-03
Dy-159	3.930E-04	0.000E+00	0.000E+00	3.930E-04
Dy-165	1.000E-06	0.000E+00	0.000E+00	1.000E-06
Eu-151	1.000E-06	0.000E+00	0.000E+00	1.000E-06
Eu-152	1.984E-02	0.000E+00	0.000E+00	1.984E-02
Eu-154	6.932E-03	0.000E+00	0.000E+00	6.932E-03
Eu-155	6.799E-03	0.000E+00	2.622E-02	3.302E-02
Fe-53	2.000E-04	0.000E+00	0.000E+00	2.000E-04
Fe-55	1.080E+03	2.855E+02	1.350E+04	1.486E+04
Fe-59	3.531E+01	2.534E+00	1.383E+00	3.923E+01
Ga-67	2.124E-01	0.000E+00	0.000E+00	2.124E-01
Ga-68	7.008E-03	0.000E+00	0.000E+00	7.008E-03
Gd-153	2.607E-01	0.000E+00	0.000E+00	2.607E-01
Ge-68	8.424E-02	0.000E+00	0.000E+00	8.424E-02
H-3	2.714E+03	5.590E+04	1.503E+02	5.876E+04
Hf-175	2.000E-06	0.000E+00	0.000E+00	2.000E-06
Hf-181	5.350E-04	0.000E+00	0.000E+00	5.350E-04
Hg-203	3.663E-02	0.000E+00	0.000E+00	3.663E-02
I-121	3.664E-03	0.000E+00	0.000E+00	3.664E-03
I-123	1.852E-01	0.000E+00	0.000E+00	1.852E-01
I-124	2.601E-02	0.000E+00	0.000E+00	2.601E-02
I-125	5.376E+01	0.000E+00	0.000E+00	5.376E+01
I-128	1.760E-03	0.000E+00	0.000E+00	1.760E-03
I-129	5.073E-02	3.371E-03	1.456E-02	6.867E-02
I-131	2.600E+00	1.230E+00	2.220E-02	3.852E+00
I-133	1.045E-02	0.000E+00	0.000E+00	1.045E-02
In-111	3.125E-01	0.000E+00	0.000E+00	3.125E-01
In-113	7.200E-05	0.000E+00	0.000E+00	7.200E-05
In-114	5.667E-03	0.000E+00	0.000E+00	5.667E-03
In-114m	2.327E-02	0.000E+00	0.000E+00	2.327E-02
Ir-192	1.217E-03	0.000E+00	0.000E+00	1.217E-03
K-40	2.700E-05	0.000E+00	0.000E+00	2.700E-05
Kr-85	6.560E+01	0.000E+00	0.000E+00	6.560E+01
La-140	2.802E-01	3.410E-01	0.000E+00	6.212E-01
Mn-51	1.000E-06	0.000E+00	0.000E+00	1.000E-06
Mn-54	2.247E+02	7.035E+01	4.092E+02	7.042E+02
Mo-99	1.512E-02	0.000E+00	0.000E+00	1.512E-02
Na-22	6.739E-01	0.000E+00	0.000E+00	6.739E-01
Na-24	1.500E-05	0.000E+00	0.000E+00	1.500E-05
Nb-94	1.046E-02	0.000E+00	1.300E-02	2.346E-02
Nb-95	5.732E+01	1.452E+01	5.662E+00	7.751E+01
Nb-96	1.000E-05	0.000E+00	0.000E+00	1.000E-05
Nb-97	4.958E-02	0.000E+00	0.000E+00	4.958E-02

Table A-6 (Continued)

Nuclide	Class A	Class B	Class C	Total
Nd-144	4.000E-05	0.000E+00	0.000E+00	4.000E-05
Ni-59	3.502E-02	1.473E+00	6.558E+00	8.066E+00
Ni-63	4.327E+01	2.614E+02	1.213E+03	1.518E+03
Ni-63AM	2.950E+00	0.000E+00	0.000E+00	2.950E+00
Ni-65	7.622E-01	0.000E+00	0.000E+00	7.622E-01
Np-237	6.290E-04	3.000E-06	0.000E+00	6.320E-04
Np-239	0.000E+00	1.290E-02	0.000E+00	1.290E-02
P-32	5.393E+01	0.000E+00	0.000E+00	5.393E+01
P-33	4.237E-03	0.000E+00	0.000E+00	4.237E-03
Pa-231	3.000E-06	0.000E+00	0.000E+00	3.000E-06
Pb-206	1.000E-05	0.000E+00	0.000E+00	1.000E-05
Pb-210	7.789E-02	0.000E+00	0.000E+00	7.789E-02
Pm-147	2.735E+00	0.000E+00	6.869E+02	6.896E+02
Po-208	3.200E-05	0.000E+00	0.000E+00	3.200E-05
Po-209	1.100E-05	0.000E+00	0.000E+00	1.100E-05
Po-210	3.161E+00	0.000E+00	0.000E+00	3.161E+00
Pt-193	1.000E-06	0.000E+00	0.000E+00	1.000E-06
Pu-236	2.000E-06	0.000E+00	0.000E+00	2.000E-06
Pu-238	6.016E-03	2.489E-03	3.747E-02	4.597E-02
Pu-239	1.398E-02	3.893E-03	9.838E-02	1.163E-01
Pu-240	3.779E-03	3.800E-04	3.041E-02	3.456E-02
Pu-241	6.001E-01	6.125E-01	2.861E+00	4.074E+00
Pu-242	7.610E-04	3.000E-06	1.400E-05	7.780E-04
Ra-226	4.005E-01	1.459E-03	5.122E-01	9.142E-01
Ra-228	6.973E-03	0.000E+00	0.000E+00	6.973E-03
Rb-83	4.200E-02	0.000E+00	0.000E+00	4.200E-02
Rb-86	1.706E-01	0.000E+00	0.000E+00	1.706E-01
Rb-95	1.000E-06	0.000E+00	0.000E+00	1.000E-06
Re-187	2.000E-06	0.000E+00	0.000E+00	2.000E-06
Rh-101	1.000E-03	0.000E+00	0.000E+00	1.000E-03
Rh-103	1.000E-03	0.000E+00	0.000E+00	1.000E-03
Rh-106	1.653E-01	0.000E+00	0.000E+00	1.653E-01
Ru-103	7.104E-01	6.300E-04	1.407E-01	8.517E-01
Ru-106	5.690E-01	2.770E-03	2.492E+01	2.549E+01
S-35	2.703E+02	0.000E+00	0.000E+00	2.703E+02
Sb-122	3.468E-03	0.000E+00	0.000E+00	3.468E-03
Sb-124	7.559E+00	4.875E+01	4.517E+00	6.083E+01
Sb-125	5.036E+00	7.321E+00	1.558E+01	2.794E+01
Sb-126	8.000E-05	0.000E+00	0.000E+00	8.000E-05
Sc-41	1.080E-04	0.000E+00	0.000E+00	1.080E-04
Sc-46	5.793E-01	0.000E+00	0.000E+00	5.793E-01
Sc-47	1.000E-06	0.000E+00	0.000E+00	1.000E-06
Sc-50	1.000E-05	0.000E+00	0.000E+00	1.000E-05
Se-75	2.428E+00	0.000E+00	0.000E+00	2.428E+00
Sm-151	1.489E+00	0.000E+00	0.000E+00	1.489E+00
Sm-153	3.141E-02	0.000E+00	0.000E+00	3.141E-02
Sn-111	1.000E-05	0.000E+00	0.000E+00	1.000E-05
Sn-113	2.634E+00	2.360E-01	2.637E-02	2.896E+00

Table A-6 (Continued)

Nuclide	Class A	Class B	Class C	Total
Sn-117	7.600E-05	0.000E+00	0.000E+00	7.600E-05
Sn-117m	1.000E-04	0.000E+00	0.000E+00	1.000E-04
Sn-119	1.310E-03	0.000E+00	0.000E+00	1.310E-03
Sn-119m	5.883E-03	0.000E+00	0.000E+00	5.883E-03
Sr-85	6.201E-01	0.000E+00	0.000E+00	6.201E-01
Sr-89	6.077E-01	1.061E+00	5.727E-01	2.241E+00
Sr-90	1.690E+00	4.002E+00	5.142E+03	5.148E+03
Sr-92	9.197E-02	0.000E+00	0.000E+00	9.197E-02
Sr-95	1.632E-03	0.000E+00	0.000E+00	1.632E-03
Ta-179	2.000E-06	0.000E+00	0.000E+00	2.000E-06
Ta-182	1.722E-03	0.000E+00	0.000E+00	1.722E-03
Tb-157	2.000E-06	0.000E+00	0.000E+00	2.000E-06
Tb-158	2.000E-06	0.000E+00	0.000E+00	2.000E-06
Tc-99	1.035E+00	1.539E-02	1.707E+00	2.758E+00
Tc-99m	1.079E+00	0.000E+00	0.000E+00	1.079E+00
Te-123	3.998E-02	0.000E+00	0.000E+00	3.998E-02
Te-123m	2.000E-02	0.000E+00	0.000E+00	2.000E-02
Te-125m	1.369E+00	5.100E-02	2.941E+00	4.361E+00
Te-132	1.000E-06	0.000E+00	0.000E+00	1.000E-06
Th-227	1.000E-05	0.000E+00	0.000E+00	1.000E-05
Th-228	7.627E-03	0.000E+00	2.300E-05	7.650E-03
Th-229	2.000E-06	0.000E+00	0.000E+00	2.000E-06
Th-230	5.590E-04	0.000E+00	0.000E+00	5.590E-04
Th-232	1.027E-01	0.000E+00	0.000E+00	1.027E-01
Th-NAT	7.912E+00	0.000E+00	0.000E+00	7.912E+00
Tl-201	1.773E-01	0.000E+00	0.000E+00	1.773E-01
Tl-202	8.973E-03	0.000E+00	0.000E+00	8.973E-03
Tl-204	7.132E-03	0.000E+00	0.000E+00	7.132E-03
Tm-170	1.000E-05	0.000E+00	0.000E+00	1.000E-05
U-232	1.000E-06	0.000E+00	0.000E+00	1.000E-06
U-233	2.177E-02	0.000E+00	0.000E+00	2.177E-02
U-234	8.737E-01	0.000E+00	2.890E-04	8.740E-01
U-235	2.923E-01	0.000E+00	3.800E-05	2.923E-01
U-236	3.600E-05	0.000E+00	0.000E+00	3.600E-05
U-238	1.156E+01	0.000E+00	5.020E-04	1.156E+01
U-DEP	3.724E-02	0.000E+00	0.000E+00	3.724E-02
U-NAT	4.165E+00	0.000E+00	0.000E+00	4.165E+00
W-181	3.000E-05	0.000E+00	0.000E+00	3.000E-05
W-188	5.000E-03	0.000E+00	0.000E+00	5.000E-03
Xe-127	7.448E-03	0.000E+00	0.000E+00	7.448E-03
Xe-131m	6.446E-03	2.060E-02	0.000E+00	2.705E-02
Xe-133	2.008E-01	0.000E+00	0.000E+00	2.008E-01
Y-88	2.967E-03	0.000E+00	0.000E+00	2.967E-03
Y-90	1.469E-02	0.000E+00	0.000E+00	1.469E-02
Yb-169	2.160E-04	0.000E+00	0.000E+00	2.160E-04
Zn-63	1.000E-03	0.000E+00	0.000E+00	1.000E-03
Zn-65	3.017E+02	3.335E+02	4.772E-02	6.353E+02
Zr-90	9.300E-04	0.000E+00	0.000E+00	9.300E-04

Table A-6 (Continued)

Nuclide	Class A	Class B	Class C	Total
Zr-95	1.105E+01	8.967E+00	3.252E+00	2.326E+01
Zr-97	4.958E-02	0.000E+00	0.000E+00	4.958E-02
Total	6.503E+03	5.980E+04	3.276E+04	9.906E+04

Table A-7. Beatty 1987 Radionuclide Distribution (Ci) by Waste Class

Nuclide	Class A	Class B	Class C	Total
Ac-227	7.780E-04	0.000E+00	0.000E+00	7.780E-04
Ag-105	5.110E-04	0.000E+00	0.000E+00	5.110E-04
Ag-108m	7.247E-01	0.000E+00	0.000E+00	7.247E-01
Ag-110m	1.156E+00	1.659E+00	0.000E+00	2.815E+00
Al-26	4.000E-05	0.000E+00	0.000E+00	4.000E-05
Am-241	1.062E-01	1.320E-04	0.000E+00	1.063E-01
Am-243	1.320E-03	0.000E+00	0.000E+00	1.320E-03
Au-195	1.103E-01	0.000E+00	0.000E+00	1.103E-01
Ba-133	4.703E-03	2.120E-04	0.000E+00	4.915E-03
Ba-140	5.794E-03	1.794E-03	0.000E+00	7.588E-03
Be-7	4.500E-05	0.000E+00	0.000E+00	4.500E-05
Bi-207	1.059E-03	0.000E+00	0.000E+00	1.059E-03
C-14	2.343E+01	2.099E-01	2.500E-04	2.364E+01
Ca-45	3.165E-01	0.000E+00	0.000E+00	3.165E-01
Ca-47	2.800E-05	0.000E+00	0.000E+00	2.800E-05
Cd-109	2.745E-01	0.000E+00	0.000E+00	2.745E-01
Ce-139	8.000E-06	0.000E+00	0.000E+00	8.000E-06
Ce-141	3.551E-02	0.000E+00	0.000E+00	3.551E-02
Ce-144	4.809E-01	1.350E-03	0.000E+00	4.823E-01
Cf-252	1.810E-04	0.000E+00	0.000E+00	1.810E-04
Cl-32	2.040E-04	0.000E+00	0.000E+00	2.040E-04
Cl-36	5.741E-02	0.000E+00	0.000E+00	5.741E-02
Cm-241	2.000E-06	0.000E+00	0.000E+00	2.000E-06
Cm-242	1.461E-03	7.400E-05	0.000E+00	1.535E-03
Cm-243	1.504E-03	0.000E+00	0.000E+00	1.504E-03
Cm-244	1.410E-02	1.000E-05	0.000E+00	1.411E-02
Co-56	7.020E-04	0.000E+00	0.000E+00	7.020E-04
Co-57	1.325E+00	1.576E-02	0.000E+00	1.340E+00
Co-58	1.447E+02	1.421E+01	0.000E+00	1.589E+02
Co-60	3.522E+02	1.367E+03	8.690E+01	1.806E+03
Cr-51	1.481E+02	3.792E+01	0.000E+00	1.860E+02
Cs-134	6.814E+00	1.469E+01	0.000E+00	2.150E+01
Cs-137	2.236E+01	8.193E+01	5.452E+01	1.588E+02
Cu-64	1.000E-06	0.000E+00	0.000E+00	1.000E-06
Cu-67	1.760E-04	0.000E+00	0.000E+00	1.760E-04
Eu-152	1.015E-02	0.000E+00	0.000E+00	1.015E-02
Eu-154	6.685E-01	0.000E+00	0.000E+00	6.685E-01
Eu-155	6.977E-01	0.000E+00	0.000E+00	6.977E-01
Eu-157	1.000E-06	0.000E+00	0.000E+00	1.000E-06
Fe-55	5.105E+02	7.696E+00	0.000E+00	5.182E+02
Fe-57	7.000E-06	0.000E+00	0.000E+00	7.000E-06
Fe-59	2.378E+01	0.000E+00	0.000E+00	2.378E+01
Ga-67	7.199E-03	0.000E+00	0.000E+00	7.199E-03
Gd-153	7.925E-02	0.000E+00	0.000E+00	7.925E-02
Ge-68	1.253E-02	0.000E+00	0.000E+00	1.253E-02

Table A-7 (Continued)

Nuclide	Class A	Class B	Class C	Total
H-3	6.639E+02	7.013E+03	8.250E-01	7.678E+03
Hf-175	6.730E-04	0.000E+00	0.000E+00	6.730E-04
Hg-203	1.710E-04	0.000E+00	0.000E+00	1.710E-04
Ho-166	1.000E-06	0.000E+00	0.000E+00	1.000E-06
I-123	1.000E-05	0.000E+00	0.000E+00	1.000E-05
I-125	3.357E+01	0.000E+00	0.000E+00	3.357E+01
I-129	1.404E-02	5.500E-05	0.000E+00	1.409E-02
I-131	1.319E+00	0.000E+00	0.000E+00	1.319E+00
In-111	1.170E-02	0.000E+00	0.000E+00	1.170E-02
In-114	1.955E-03	0.000E+00	0.000E+00	1.955E-03
Ir-192	1.242E+00	0.000E+00	0.000E+00	1.242E+00
Kr-85	1.643E+00	4.610E-01	0.000E+00	2.104E+00
La-140	6.932E-03	1.794E-03	0.000E+00	8.726E-03
Mn-54	2.430E+02	2.189E+01	0.000E+00	2.649E+02
Mo-99	1.000E-05	0.000E+00	0.000E+00	1.000E-05
Na-20	3.000E-05	0.000E+00	0.000E+00	3.000E-05
Na-22	7.478E-01	0.000E+00	0.000E+00	7.478E-01
Nb-94	2.420E-03	0.000E+00	0.000E+00	2.420E-03
Nb-95	9.392E-01	1.460E-01	0.000E+00	1.085E+00
Ni-59	5.839E-02	0.000E+00	0.000E+00	5.839E-02
Ni-63	1.505E+01	5.668E+00	0.000E+00	2.072E+01
Np-237	1.100E-04	0.000E+00	0.000E+00	1.100E-04
Os-191	1.000E-04	0.000E+00	0.000E+00	1.000E-04
P-32	6.901E+00	0.000E+00	0.000E+00	6.901E+00
P-33	2.540E-04	0.000E+00	0.000E+00	2.540E-04
Pa-231	4.000E-06	0.000E+00	0.000E+00	4.000E-06
Pb-203	3.900E-04	0.000E+00	0.000E+00	3.900E-04
Pb-210	8.500E-05	0.000E+00	0.000E+00	8.500E-05
Pm-147	4.408E-02	0.000E+00	0.000E+00	4.408E-02
Po-210	2.312E-02	0.000E+00	0.000E+00	2.312E-02
Pt-193	1.000E-06	0.000E+00	0.000E+00	1.000E-06
Pt-195m	1.307E-02	0.000E+00	0.000E+00	1.307E-02
Pu-238	9.053E-03	3.100E-05	0.000E+00	9.084E-03
Pu-239	4.312E-02	2.900E-05	0.000E+00	4.315E-02
Pu-240	4.215E-03	0.000E+00	0.000E+00	4.215E-03
Pu-241	2.342E-01	3.941E-03	0.000E+00	2.382E-01
Pu-242	1.913E-03	0.000E+00	0.000E+00	1.913E-03
Ra-226	3.937E+00	1.040E-02	0.000E+00	3.947E+00
Rb-86	2.163E-02	0.000E+00	0.000E+00	2.163E-02
Ru-103	5.643E-03	0.000E+00	0.000E+00	5.643E-03
Ru-106	2.155E-02	0.000E+00	0.000E+00	2.155E-02
S-35	7.388E+00	0.000E+00	0.000E+00	7.388E+00
Sb-124	6.759E+00	0.000E+00	0.000E+00	6.759E+00
Sb-125	8.814E-02	2.780E-02	0.000E+00	1.159E-01
Sc-46	6.069E-02	0.000E+00	0.000E+00	6.069E-02
Sc-47	1.000E-03	0.000E+00	0.000E+00	1.000E-03
Se-75	4.936E-02	0.000E+00	0.000E+00	4.936E-02
Sm-151	1.897E-03	0.000E+00	0.000E+00	1.897E-03

Table A-7 (Continued)

Nuclide	Class A	Class B	Class C	Total
Sn-113	2.603E-02	0.000E+00	0.000E+00	2.603E-02
Sn-131	9.000E-06	0.000E+00	0.000E+00	9.000E-06
Sr-85	6.418E-02	0.000E+00	0.000E+00	6.418E-02
Sr-86	1.000E-06	0.000E+00	0.000E+00	1.000E-06
Sr-89	8.801E-02	0.000E+00	0.000E+00	8.801E-02
Sr-90	2.640E-01	2.291E+01	1.412E+01	3.730E+01
Sr-91	5.511E-02	0.000E+00	0.000E+00	5.511E-02
Ta-181	9.992E-03	0.000E+00	0.000E+00	9.992E-03
Ta-182	1.374E-02	0.000E+00	0.000E+00	1.374E-02
Tc-99	2.791E-01	7.500E-05	0.000E+00	2.792E-01
Tc-99m	3.280E-03	0.000E+00	0.000E+00	3.280E-03
Te-123	2.875E-02	0.000E+00	0.000E+00	2.875E-02
Te-125m	0.000E+00	6.740E-03	0.000E+00	6.740E-03
Th-228	2.710E-04	0.000E+00	0.000E+00	2.710E-04
Th-230	1.100E-05	0.000E+00	0.000E+00	1.100E-05
Th-232	1.553E-02	0.000E+00	0.000E+00	1.553E-02
Th-NAT	6.636E-02	0.000E+00	0.000E+00	6.636E-02
Tl-201	4.591E-01	0.000E+00	0.000E+00	4.591E-01
Tl-204	1.833E-03	0.000E+00	0.000E+00	1.833E-03
U-233	4.984E-03	0.000E+00	0.000E+00	4.984E-03
U-234	1.106E+00	0.000E+00	0.000E+00	1.106E+00
U-235	5.870E-02	0.000E+00	0.000E+00	5.870E-02
U-236	9.771E-03	0.000E+00	0.000E+00	9.771E-03
U-238	1.085E+02	1.280E-04	0.000E+00	1.085E+02
U-239	1.430E-04	0.000E+00	0.000E+00	1.430E-04
U-DEP	1.260E-01	0.000E+00	0.000E+00	1.260E-01
U-NAT	2.007E-01	0.000E+00	0.000E+00	2.007E-01
W-188	6.000E-06	0.000E+00	0.000E+00	6.000E-06
Xe-133	8.611E-02	0.000E+00	0.000E+00	8.611E-02
Y-88	1.090E-04	0.000E+00	0.000E+00	1.090E-04
Y-90	6.890E-04	0.000E+00	0.000E+00	6.890E-04
Yb-169	2.416E-03	0.000E+00	0.000E+00	2.416E-03
Zn-65	1.749E+01	0.000E+00	0.000E+00	1.749E+01
Zr-95	4.492E-01	7.820E-02	0.000E+00	5.274E-01
Total	2.355E+03	8.590E+03	1.564E+02	1.110E+04

Table A-8. Beatty 1988 Radionuclide Distribution (Ci) by Waste Class

Nuclide	Class A	Class B	Class C	Total
Ac-227	1.937E-03	0.000E+00	0.000E+00	1.937E-03
Ag-110	2.049E-02	0.000E+00	0.000E+00	2.049E-02
Ag-110m	7.448E-02	0.000E+00	0.000E+00	7.448E-02
Am-241	2.282E-01	2.600E-05	3.038E-02	2.586E-01
As-73	5.300E-05	0.000E+00	0.000E+00	5.300E-05
Au-195	6.800E-05	3.000E-06	0.000E+00	7.100E-05
Ba-133	6.690E-03	9.660E-04	3.000E-06	7.651E-03
Ba-140	1.490E-04	0.000E+00	0.000E+00	1.490E-04
Be-7	1.710E-03	0.000E+00	0.000E+00	1.710E-03
Bi-205	9.000E-06	0.000E+00	0.000E+00	9.000E-06
Bi-207	2.710E-04	0.000E+00	0.000E+00	2.710E-04
Bi-210	1.030E-04	0.000E+00	0.000E+00	1.030E-04
C-14	5.975E+00	5.085E-02	1.650E+00	7.676E+00
Ca-45	1.265E-01	0.000E+00	0.000E+00	1.265E-01
Cd-109	3.690E-02	1.000E-06	0.000E+00	3.690E-02
Ce-141	3.398E-02	0.000E+00	0.000E+00	3.398E-02
Ce-144	6.839E-01	1.000E-06	0.000E+00	6.839E-01
Cf-252	0.000E+00	4.200E-05	0.000E+00	4.200E-05
Cl-36	1.333E-02	0.000E+00	0.000E+00	1.333E-02
Cm-241	7.700E-05	0.000E+00	0.000E+00	7.700E-05
Cm-242	9.080E-02	0.000E+00	0.000E+00	9.081E-02
Cm-243	8.200E-05	0.000E+00	0.000E+00	8.200E-05
Cm-244	5.300E-05	0.000E+00	2.740E-02	2.745E-02
Co-57	7.731E+00	1.445E-03	0.000E+00	7.732E+00
Co-58	3.383E+01	2.030E+01	0.000E+00	5.413E+01
Co-60	5.821E+02	1.248E+02	1.970E+02	9.039E+02
Cr-51	2.193E+02	0.000E+00	0.000E+00	2.193E+02
Cs-134	7.728E+00	4.336E+01	0.000E+00	5.109E+01
Cs-136	2.400E-02	0.000E+00	0.000E+00	2.400E-02
Cs-137	1.903E+01	1.583E+02	2.340E+03	2.518E+03
Dy-159	2.000E-06	0.000E+00	0.000E+00	2.000E-06
Eu-152	4.750E-04	1.000E-06	0.000E+00	4.760E-04
Eu-154	2.240E-04	0.000E+00	0.000E+00	2.240E-04
Eu-155	2.200E-05	0.000E+00	0.000E+00	2.200E-05
Fe-55	1.237E+03	5.417E+00	0.000E+00	1.242E+03
Fe-59	6.421E-01	0.000E+00	0.000E+00	6.421E-01
Ga-67	8.476E-03	0.000E+00	0.000E+00	8.476E-03
Gd-153	1.540E-01	3.000E-03	0.000E+00	1.570E-01
Ge-68	3.867E-03	0.000E+00	0.000E+00	3.867E-03
H-3	9.237E+01	3.214E+03	0.000E+00	3.307E+03
Hf-181	6.800E-05	0.000E+00	0.000E+00	6.800E-05
Hg-203	5.000E-06	0.000E+00	0.000E+00	5.000E-06
I-121	1.478E-03	0.000E+00	0.000E+00	1.478E-03
I-123	4.089E-03	0.000E+00	0.000E+00	4.089E-03
I-124	1.000E-06	0.000E+00	0.000E+00	1.000E-06

Table A-8 (Continued)

Nuclide	Class A	Class B	Class C	Total
I-125	2.836E+01	2.000E-06	0.000E+00	2.836E+01
I-129	2.386E-02	2.000E-06	0.000E+00	2.386E-02
I-131	1.119E+00	0.000E+00	0.000E+00	1.119E+00
In-111	1.632E-02	0.000E+00	0.000E+00	1.632E-02
In-113	1.250E-04	0.000E+00	0.000E+00	1.250E-04
In-114	7.790E-04	0.000E+00	0.000E+00	7.790E-04
Ir-192	9.064E-01	0.000E+00	0.000E+00	9.064E-01
K-40	4.400E-05	0.000E+00	0.000E+00	4.400E-05
Kr-85	6.696E+01	1.500E-02	0.000E+00	6.697E+01
Mn-54	1.612E+02	5.647E+00	0.000E+00	1.668E+02
Mo-93	1.000E-06	0.000E+00	0.000E+00	1.000E-06
Mo-99	1.710E-04	0.000E+00	0.000E+00	1.710E-04
Na-22	3.794E-02	1.000E-06	0.000E+00	3.794E-02
Na-24	1.101E-03	0.000E+00	0.000E+00	1.101E-03
Nb-94	7.430E-04	0.000E+00	0.000E+00	7.430E-04
Nb-95	2.432E-01	0.000E+00	0.000E+00	2.432E-01
Nd-147	1.000E-06	0.000E+00	0.000E+00	1.000E-06
Ni-59	1.820E-04	0.000E+00	0.000E+00	1.820E-04
Ni-63	5.084E+00	1.084E+01	0.000E+00	1.592E+01
P-32	2.380E+01	0.000E+00	0.000E+00	2.380E+01
Pa-234	2.000E-06	0.000E+00	0.000E+00	2.000E-06
Pb-210	8.330E-04	2.000E-06	0.000E+00	8.350E-04
Pm-147	5.136E-01	0.000E+00	0.000E+00	5.136E-01
Po-210	1.404E-02	0.000E+00	0.000E+00	1.404E-02
Pr-147	1.000E-06	0.000E+00	0.000E+00	1.000E-06
Pt-195	5.000E-03	0.000E+00	0.000E+00	5.000E-03
Pu-238	1.774E-02	0.000E+00	6.000E-02	7.774E-02
Pu-239	4.506E-02	0.000E+00	0.000E+00	4.506E-02
Pu-240	2.220E-02	0.000E+00	0.000E+00	2.220E-02
Pu-241	9.274E-01	0.000E+00	0.000E+00	9.274E-01
Pu-242	3.420E-04	0.000E+00	0.000E+00	3.420E-04
Ra-226	1.090E+01	6.719E-02	9.941E-01	1.196E+01
Ra-228	2.940E-04	0.000E+00	0.000E+00	2.940E-04
Rb-86	1.238E-02	0.000E+00	0.000E+00	1.238E-02
Ru-103	4.997E-03	0.000E+00	0.000E+00	4.997E-03
Ru-106	3.070E-04	1.000E-06	0.000E+00	3.080E-04
S-35	5.371E+00	0.000E+00	0.000E+00	5.371E+00
Sb-122	1.900E-05	0.000E+00	0.000E+00	1.900E-05
Sb-124	7.203E+00	0.000E+00	0.000E+00	7.203E+00
Sb-125	2.828E-01	0.000E+00	0.000E+00	2.828E-01
Sc-46	1.088E-02	0.000E+00	0.000E+00	1.088E-02
Sc-47	3.000E-03	0.000E+00	0.000E+00	3.000E-03
Se-75	8.065E-03	0.000E+00	0.000E+00	8.065E-03
Sm-151	4.000E-06	0.000E+00	0.000E+00	4.000E-06
Sn-111	1.460E-04	0.000E+00	0.000E+00	1.460E-04
Sn-113	1.097E-02	1.000E-06	0.000E+00	1.097E-02
Sn-119m	1.000E-06	0.000E+00	0.000E+00	1.000E-06
Sr-85	1.034E-02	0.000E+00	0.000E+00	1.034E-02

Table A-8 (Continued)

Nuclide	Class A	Class B	Class C	Total
Sr-89	2.834E-03	0.000E+00	0.000E+00	2.834E-03
Sr-90	3.440E-01	6.672E+00	1.280E+01	1.982E+01
Ta-179	2.000E-06	0.000E+00	0.000E+00	2.000E-06
Ta-182	4.446E-03	0.000E+00	0.000E+00	4.446E-03
Tb-157	1.000E-05	0.000E+00	0.000E+00	1.000E-05
Tb-158	1.000E-05	0.000E+00	0.000E+00	1.000E-05
Tc-99	1.332E-01	1.000E-06	0.000E+00	1.332E-01
Tc-99m	6.108E-03	0.000E+00	0.000E+00	6.108E-03
Te-123	4.248E-03	0.000E+00	0.000E+00	4.248E-03
Te-125m	2.190E-04	0.000E+00	0.000E+00	2.190E-04
Te-129m	3.000E-06	0.000E+00	0.000E+00	3.000E-06
Th-228	1.690E-04	2.000E-05	0.000E+00	1.890E-04
Th-230	1.147E-03	0.000E+00	0.000E+00	1.147E-03
Th-232	2.766E-02	1.078E-03	0.000E+00	2.874E-02
Th-NAT	7.540E-04	0.000E+00	0.000E+00	7.540E-04
Th-235	2.500E-05	0.000E+00	0.000E+00	2.500E-05
Tl-201	3.435E-03	0.000E+00	0.000E+00	3.435E-03
Tl-204	1.895E-03	1.000E-05	0.000E+00	1.905E-03
Tm-171	2.000E-05	0.000E+00	0.000E+00	2.000E-05
U-232	1.000E-06	0.000E+00	0.000E+00	1.000E-06
U-233	1.000E-06	0.000E+00	0.000E+00	1.000E-06
U-234	1.723E-02	0.000E+00	0.000E+00	1.723E-02
U-235	1.104E-03	0.000E+00	1.000E-03	2.104E-03
U-236	2.600E-05	0.000E+00	0.000E+00	2.600E-05
U-238	1.358E+01	0.000E+00	2.358E-03	1.359E+01
U-DEP	3.492E-03	0.000E+00	0.000E+00	3.492E-03
U-NAT	4.807E-02	1.606E-04	0.000E+00	4.968E-02
W-178	6.792E-03	0.000E+00	0.000E+00	6.792E-03
Xe-127	2.700E-05	0.000E+00	0.000E+00	2.700E-05
Y-88	1.983E-02	0.000E+00	0.000E+00	1.983E-02
Y-90	9.481E-03	1.000E-06	0.000E+00	9.482E-03
Zn-65	1.428E+01	1.100E-05	0.000E+00	1.428E+01
Zr-95	9.050E-02	0.000E+00	0.000E+00	9.050E-02
Zr-97	2.100E-05	0.000E+00	0.000E+00	2.100E-05
Total	2.549E+03	3.590E+03	2.553E+03	8.691E+03

Table A-9. Beatty 1989 Radionuclide Distribution (Ci) by Waste Class

Nuclide	Class A	Class B	Class C	Total
Ac-227	3.740E-04	0.000E+00	0.000E+00	3.740E-04
Ag-110	6.644E-02	0.000E+00	0.000E+00	6.644E-02
Ag-110m	2.638E-01	1.262E+00	0.000E+00	1.525E+00
Am-241	7.431E-02	2.026E-03	3.889E+00	3.965E+00
As-76	3.200E-05	0.000E+00	0.000E+00	3.200E-05
Au-195	4.917E-02	0.000E+00	0.000E+00	4.917E-02
Au-198	2.000E-06	0.000E+00	0.000E+00	2.000E-06
Ba-133	4.844E-02	1.500E-05	0.000E+00	4.845E-02
Ba-137	1.000E-05	0.000E+00	0.000E+00	1.000E-05
Ba-137m	1.000E-06	0.000E+00	0.000E+00	1.000E-06
Ba-140	1.941E-03	0.000E+00	0.000E+00	1.941E-03
Be-7	2.100E-05	0.000E+00	0.000E+00	2.100E-05
Bi-207	2.100E-05	0.000E+00	0.000E+00	2.100E-05
Bi-210	3.080E-04	0.000E+00	0.000E+00	3.080E-04
Bi-214	1.000E-06	0.000E+00	0.000E+00	1.000E-06
Br-85	1.000E-05	0.000E+00	0.000E+00	1.000E-05
C-14	9.884E+00	1.875E-02	1.615E+01	2.606E+01
Ca-45	1.959E-01	0.000E+00	0.000E+00	1.959E-01
Cd-109	1.566E-01	1.000E-06	0.000E+00	1.566E-01
Cd-113	1.000E-06	0.000E+00	0.000E+00	1.000E-06
Cd-115	1.000E-06	0.000E+00	0.000E+00	1.000E-06
Ce-139	1.000E-06	0.000E+00	0.000E+00	1.000E-06
Ce-141	1.247E-02	0.000E+00	0.000E+00	1.247E-02
Ce-144	5.049E-02	0.000E+00	0.000E+00	5.049E-02
Cf-252	2.370E-04	4.000E-05	0.000E+00	2.770E-04
Ct-36	2.120E-02	0.000E+00	0.000E+00	2.120E-02
Ct-38	1.000E-04	0.000E+00	0.000E+00	1.000E-04
Cm-242	3.130E-03	6.000E-05	0.000E+00	3.190E-03
Cm-243	3.000E-06	0.000E+00	0.000E+00	3.000E-06
Cm-244	3.420E-04	0.000E+00	2.000E-06	3.440E-04
Co-56	1.000E-05	0.000E+00	0.000E+00	1.000E-05
Co-57	2.351E+00	1.440E-04	3.866E-03	2.355E+00
Co-58	4.443E+01	3.195E-01	0.000E+00	4.475E+01
Co-60	1.051E+03	1.065E+04	2.477E+02	1.195E+04
Cr-51	9.636E+01	1.153E-01	0.000E+00	9.648E+01
Cs-134	1.732E+00	9.075E+00	1.250E-03	1.081E+01
Cs-135	6.300E-05	0.000E+00	0.000E+00	6.300E-05
Cs-136	4.000E-06	0.000E+00	0.000E+00	4.000E-06
Cs-137	1.475E+01	2.186E+02	2.774E+03	3.008E+03
Cu-64	1.000E-06	0.000E+00	0.000E+00	1.000E-06
Cu-67	1.470E-04	0.000E+00	0.000E+00	1.470E-04
Eu-152	1.900E-04	0.000E+00	0.000E+00	1.900E-04
Eu-154	2.568E-03	0.000E+00	0.000E+00	2.568E-03
Eu-155	4.780E-04	0.000E+00	0.000E+00	4.780E-04
Fe-55	1.992E+03	4.490E+00	4.390E+02	2.436E+03

Table A-9 (Continued)

<u>Nuclide</u>	<u>Class A</u>	<u>Class B</u>	<u>Class C</u>	<u>Total</u>
Fe-59	2.370E+01	0.000E+00	0.000E+00	2.370E+01
Ga-67	9.958E-03	0.000E+00	0.000E+00	9.958E-03
Gd-148	2.000E-06	0.000E+00	0.000E+00	2.000E-06
Gd-153	5.601E-01	9.000E-06	0.000E+00	5.601E-01
Ge-68	1.311E-02	0.000E+00	0.000E+00	1.311E-02
H-3	4.183E+02	2.310E+04	6.011E+02	2.412E+04
Hf-181	4.856E-03	0.000E+00	0.000E+00	4.856E-03
Hg-203	6.900E-05	1.500E-05	0.000E+00	8.400E-05
I-123	2.126E-03	0.000E+00	0.000E+00	2.126E-03
I-124	3.077E-02	0.000E+00	0.000E+00	3.077E-02
I-125	2.748E+01	1.970E-03	0.000E+00	2.748E+01
I-129	1.047E-02	1.000E-06	2.000E-06	1.048E-02
I-131	4.459E-01	0.000E+00	0.000E+00	4.459E-01
In-111	1.076E-01	0.000E+00	0.000E+00	1.076E-01
In-113	1.000E-05	0.000E+00	0.000E+00	1.000E-05
In-114	7.120E-04	0.000E+00	0.000E+00	7.120E-04
In-114m	5.550E-04	0.000E+00	0.000E+00	5.550E-04
Ir-192	1.963E+01	0.000E+00	0.000E+00	1.963E+01
Kr-85	3.711E+01	1.000E+00	0.000E+00	3.811E+01
Mn-54	3.889E+02	1.335E+01	2.279E+00	4.046E+02
Mo-99	2.127E-03	0.000E+00	0.000E+00	2.127E-03
Na-22	1.774E-01	1.600E-05	0.000E+00	1.774E-01
Na-24	1.000E-03	0.000E+00	0.000E+00	1.000E-03
Nb-93m	3.208E-02	0.000E+00	0.000E+00	3.208E-02
Nb-94	4.422E-02	0.000E+00	2.000E-06	4.422E-02
Nb-95	2.635E-01	0.000E+00	0.000E+00	2.635E-01
Ni-59	5.200E-05	0.000E+00	2.408E+00	2.408E+00
Ni-61	3.600E-04	0.000E+00	0.000E+00	3.600E-04
Ni-63	2.871E+01	4.259E-01	2.980E+02	3.271E+02
Ni-65	1.000E-02	0.000E+00	0.000E+00	1.000E-02
Np-237	2.000E-05	0.000E+00	0.000E+00	2.000E-05
P-32	1.773E+01	0.000E+00	0.000E+00	1.773E+01
P-33	1.600E-05	0.000E+00	0.000E+00	1.600E-05
Pa-231	1.400E-05	0.000E+00	0.000E+00	1.400E-05
Pa-233	1.000E-06	0.000E+00	0.000E+00	1.000E-06
Pa-234	1.000E-06	0.000E+00	0.000E+00	1.000E-06
Pb-210	6.300E-01	1.000E-06	0.000E+00	6.300E-01
Pm-147	2.259E+00	1.148E-02	0.000E+00	2.271E+00
Po-208	3.000E-06	0.000E+00	0.000E+00	3.000E-06
Po-210	5.529E-01	0.000E+00	0.000E+00	5.529E-01
Pt-193	0.000E+00	0.000E+00	2.000E-06	2.000E-06
Pu-238	4.347E-03	0.000E+00	6.002E-02	6.437E-02
Pu-239	1.611E-02	0.000E+00	2.000E-06	1.611E-02
Pu-240	5.953E-03	0.000E+00	2.000E-06	5.955E-03
Pu-241	2.184E-01	3.795E-03	6.000E-05	2.223E-01
Pu-242	3.350E-04	0.000E+00	0.000E+00	3.350E-04
Ra-225	2.650E-01	0.000E+00	0.000E+00	2.650E-01
Ra-226	2.417E+01	7.702E-01	1.667E-02	2.496E+01

Table A-9 (Continued)

Nuclide	Class A	Class B	Class C	Total
Ra-228	1.620E-04	0.000E+00	0.000E+00	1.620E-04
Rb-83	1.000E-06	0.000E+00	0.000E+00	1.000E-06
Rb-86	3.873E-02	0.000E+00	0.000E+00	3.873E-02
Ru-103	2.532E-02	0.000E+00	0.000E+00	2.532E-02
Ru-105	2.300E-05	0.000E+00	0.000E+00	2.300E-05
Ru-106	2.638E-03	0.000E+00	0.000E+00	2.638E-03
S-35	7.096E+00	0.000E+00	0.000E+00	7.096E+00
Sb-124	1.831E-01	0.000E+00	0.000E+00	1.831E-01
Sb-125	2.745E-01	0.000E+00	0.000E+00	2.745E-01
Sc-46	1.717E-02	0.000E+00	0.000E+00	1.717E-02
Se-75	7.873E-03	0.000E+00	0.000E+00	7.873E-03
Sm-151	5.680E-02	0.000E+00	0.000E+00	5.680E-02
Sn-113	1.678E-02	0.000E+00	0.000E+00	1.678E-02
Sn-119	4.000E-05	0.000E+00	0.000E+00	4.000E-05
Sn-125	2.600E-05	0.000E+00	0.000E+00	2.600E-05
Sr-85	1.448E-02	0.000E+00	0.000E+00	1.448E-02
Sr-89	8.653E-03	0.000E+00	0.000E+00	8.653E-03
Sr-90	7.869E-01	1.437E+01	3.200E+01	4.716E+01
Ta-182	8.010E-04	0.000E+00	0.000E+00	8.010E-04
Tb-160	3.000E-06	0.000E+00	0.000E+00	3.000E-06
Tc-99	3.198E-01	1.800E-04	2.000E-06	3.200E-01
Tc-99m	2.132E-02	0.000E+00	0.000E+00	2.132E-02
Te-123	1.300E-05	0.000E+00	0.000E+00	1.300E-05
Te-123m	2.700E-05	0.000E+00	0.000E+00	2.700E-05
Th-228	1.018E-03	0.000E+00	0.000E+00	1.018E-03
Th-230	6.030E-04	5.000E-06	0.000E+00	6.080E-04
Th-232	1.011E+00	7.200E-05	0.000E+00	1.011E+00
Th-NAT	6.810E-04	0.000E+00	0.000E+00	6.810E-04
Tl-201	1.675E-02	0.000E+00	0.000E+00	1.675E-02
Tl-204	5.082E-02	1.775E-03	0.000E+00	5.259E-02
U-233	2.408E-02	0.000E+00	0.000E+00	2.408E-02
U-234	3.978E-03	0.000E+00	0.000E+00	3.978E-03
U-235	1.141E-03	1.000E-06	0.000E+00	1.142E-03
U-236	5.400E-05	0.000E+00	0.000E+00	5.400E-05
U-238	1.463E+01	2.000E-06	0.000E+00	1.463E+01
U-DEP	3.439E-01	0.000E+00	0.000E+00	3.439E-01
U-NAT	1.543E-02	3.410E-04	0.000E+00	1.577E-02
V-48	1.000E-05	0.000E+00	0.000E+00	1.000E-05
W-185	1.065E-03	0.000E+00	0.000E+00	1.065E-03
Xe-133	6.000E-06	0.000E+00	0.000E+00	6.000E-06
Y-88	1.100E-05	1.500E-05	0.000E+00	2.600E-05
Y-90	5.291E-02	0.000E+00	0.000E+00	5.291E-02
Yb-169	8.000E-06	0.000E+00	0.000E+00	8.000E-06
Zn-65	2.118E+01	6.000E-06	0.000E+00	2.118E+01
Zr-95	1.715E-01	0.000E+00	0.000E+00	1.715E-01
Total	4.251E+03	3.401E+04	4.417E+03	4.268E+04

APPENDIX B

ISOTOPIC DISTRIBUTION BY WASTE CLASS AND GENERAL INDUSTRY

APPENDIX B

ISOTOPIC DISTRIBUTION BY WASTE CLASS AND GENERAL INDUSTRY

This appendix presents isotopic distributions as a function of waste class and general industry for low-level waste disposed at the Richland, WA, and Beatty, NV, disposal facilities during 1987, 1988, and 1989. Isotopic distributions for Class A wastes are divided into two subclasses: Class A wastes that have been disposed in a manner that meets the structural stability requirements of 10 CFR 61.56 (denoted Class AS waste), and Class A wastes that have not been disposed in manner that meets the structural stability requirements of 10 CFR 61.56 (denoted Class AU waste). All isotopic distributions are given in units of millicuries.

Five industry categories are considered: utilities, colleges or universities, hospitals, government, and private industry. For wastes delivered to the disposal facility via a waste broker or a waste processor, the distributions are tracked back to the original generator. For example, if a utility delivers waste to a waste processor who reduces the volume of the waste and ships the processed waste to a disposal facility, the isotopic distributions are herein listed under the utility category rather than the private industry category.

Table B-1. Beatty 1987 Isotopic Distribution (mCi) by General Industry

Colleges

Nuclide	Class AU	Class AS	Class B	Class C	Total
C-14	3.484				3.484
Ca-45	1.083				1.083
Co-57	.070				.070
Co-60	.041				.041
Cr-51	3.948				3.948
Cs-137	.195				.195
Fe-55	.281				.281
Gd-153	.748				.748
H-3	507.216				507.216
I-125	21.348				21.348
I-131	.027				.027
Nb-95	.285				.285
Ni-63	.366				.366
P-32	.957				.957
S-35	7.106				7.106
Zn-65	.085				.085
Total	547.240				547.240

Government

Nuclide	Class AU	Class AS	Class B	Class C	Total
Ag-110m	1.844				1.844
Ba-140	.009				.009
C-14	11.721				11.721
Co-58	279.291				279.291
Co-60	829.748				829.748
Cr-51	1.618				1.618
Cs-134	.080				.080
Cs-137	3,250.444				3,250.444
Fe-55	754.498				754.498
Fe-59	6.014				6.014
H-3	5.822				5.822
I-131	.001				.001
Mn-54	118.750				118.750
Nb-95	.496				.496
Ni-63	29.983				29.983

Table B-1 (Continued)

<u>Nuclide</u>	<u>Class AU</u>	<u>Class AS</u>	<u>Class B</u>	<u>Class C</u>	<u>Total</u>
Sb-125	.438				.438
Sr-90	.022				.022
Ta-182	1.007				1.007
Zr-95	1.459				1.459
Total	5,293.245				5,293.245

Industry

<u>Nuclide</u>	<u>Class AU</u>	<u>Class AS</u>	<u>Class B</u>	<u>Class C</u>	<u>Total</u>
Ac-227		.778			.778
Ag-105	.511				.511
Ag-108m	724.680				724.680
Ag-110m	390.519				390.519
Al-26	.040				.040
Am-241	104.333	1.778	.117		106.228
Am-243	1.320				1.320
Au-195	110.257				110.257
Ba-133	4.465	.238	.212		4.915
Ba-140	.007				.007
Be-7	.045				.045
Bi-207	1.059				1.059
C-14	21,415.779	13.990		.250	21,430.019
Ca-45	315.464				315.464
Ca-47	.028				.028
Cd-109	273.521	.953			274.474
Ce-139	.008				.008
Ce-141	6.412				6.412
Ce-144	59.394	.016			59.410
Cf-252	.181				.181
Cl-32	.204				.204
Cl-36	57.407	.001			57.408
Cm-242	1.171				1.171
Cm-243	1.502				1.502
Cm-244	14.039				14.039
Co-56	.702				.702
Co-57	1,281.572	6.996	15.356		1,303.924
Co-58	12,875.208				12,875.208
Co-60	62,646.844	653.953	1,300,700.048	86,900.000	1,450,900.845
Cr-51	3,357.980				3,357.980
Cs-134	159.488				159.488
Cs-137	5,046.368	1,142.069	52,521.179	54,525.000	113,234.616

Table B-1 (Continued)

Nuclide	Class AU	Class AS	Class B	Class C	Total
Cu-64	.001				.001
Cu-67	.176				.176
Eu-152	10.149				10.149
Eu-154	2.290				2.290
Eu-155	.204				.204
Eu-157	.001				.001
Fe-55	61,026.814	14.039			61,040.853
Fe-57	.007				.007
Fe-59	124.973				124.973
Ga-67	7.199				7.199
Gd-153	78.500				78.500
Ge-68	12.533				12.533
H-3	565,634.995	583.300	7,013,301.953	825.000	7,580,345.248
Hf-175	.673				.673
Hg-203	.171				.171
Ho-166	.001				.001
I-123	.010				.010
I-125	33,551.311	.002			33,551.313
I-129	4.164	.004	.001		4.169
I-131	800.118	.001			800.119
In-111	11.696				11.696
In-114	1.955				1.955
Ir-192	1,241.624				1,241.624
Kr-85	1,163.125	479.753	460.953		2,103.831
La-140	6.913				6.913
Mn-54	3,148.420	.005			3,148.425
Mo-99	.010				.010
Na-20	.030				.030
Na-22	734.076	13.730			747.806
Nb-94	1.823				1.823
Nb-95	323.450				323.450
Ni-59	58.091	.001			58.092
Ni-63	5,927.245	19.967	191.988		6,139.200
Np-237	.104				.104
Os-191	.100				.100
P-32	6,899.851				6,899.851
P-33	.254				.254
Pa-231		.004			.004
Pb-203	.390				.390
Pb-210	.079	.006			.085
Pm-147	44.075				44.075
Po-210	23.116				23.116
Pt-193		.001			.001
Pt-195m	13.073				13.073
Pu-238	8.813				8.813

Table B-1 (Continued)

Nuclide	Class AU	Class AS	Class B	Class C	Total
Pu-239	42.778	.007			42.785
Pu-240	3.886				3.886
Pu-241	102.131				102.131
Pu-242	1.913				1.913
Ra-226	2,689.687	1,247.339	10.398		3,947.424
Rb-86	21.629				21.629
Ru-103	5.643				5.643
Ru-106	11.449	.006			11.455
S-35	7,332.680	.524			7,333.204
Sb-124	.461				.461
Sb-125	50.047	.016			50.063
Sc-46	60.690				60.690
Sc-47	1.000				1.000
Se-75	49.358				49.358
Sm-151	1.897				1.897
Sn-113	25.983				25.983
Sn-131	.009				.009
Sr-85	64.184				64.184
Sr-86	.001				.001
Sr-89	86.534				86.534
Sr-90	217.561	.049	22,878.691	14,121.000	37,217.301
Sr-91	55.108				55.108
Ta-181	9.992				9.992
Ta-182	12.737				12.737
Tc-99	259.854	.005			259.859
Tc-99m	3.280				3.280
Te-123	28.749				28.749
Th-228	.271				.271
Th-230	.011				.011
Th-232	14.505	1.023			15.528
Th-NAT	66.365				66.365
Tl-201	459.136				459.136
Tl-204	1.832	.001			1.833
U-233	4.984				4.984
U-234	1,106.314				1,106.314
U-235	58.700				58.700
U-236	9.771				9.771
U-238	108,545.573	3.613	.128		108,549.314
U-239	.143				.143
U-DEP	126.036				126.036
U-NAT	200.701				200.701
W-188	.006				.006
Xe-133	84.739				84.739
Y-88	.109				.109
Y-90	.689				.689

Table B-1 (Continued)

Nuclide	Class AU	Class AS	Class B	Class C	Total
Yb-169	2.416				2.416
Zn-65	221.742				221.742
Zr-95	153.011				153.011
Total	911,909.406	4,184.168	8,390,081.024	156,371.250	9,462,545.848

Utilities

Nuclide	Class AU	Class AS	Class B	Class C	Total
Ag-110m	9.023	754.338	1,659.000		2,422.361
Am-241	.043	.004	.015		.062
Ba-140	5.778		1.794		7.572
C-14	1,964.701	22.207	209.888		2,196.796
Cd-109	.009				.009
Ce-141	29.100				29.100
Ce-144	421.515		1.350		422.865
Cm-241	.002				.002
Cm-242	.215	.075	.074		.364
Cm-243		.002			.002
Cm-244	.059	.003	.010		.072
Co-57	35.886	.003	.407		36.296
Co-58	124,502.207	7,052.428	14,208.000		145,762.635
Co-60	200,059.940	87,978.309	66,323.000		354,361.249
Cr-51	130,119.140	14,626.520	37,921.000		182,666.660
Cs-134	5,180.288	1,473.760	14,689.000		21,343.048
Cs-137	10,301.851	2,616.132	29,408.000		42,325.983
Eu-154	666.207				666.207
Eu-155	697.494				697.494
Fe-55	325,714.122	123,015.435	7,695.500		456,425.057
Fe-59	23,312.100	333.553			23,645.653
H-3	91,558.951	5,618.956	15.942		97,193.849
I-129	9.642	.228	.054		9.924
I-131	518.997				518.997
La-140	.019		1.794		1.813
Mn-54	208,390.082	31,357.318	21,892.400		261,639.800
Nb-94	.597				.597
Nb-95	487.960	127.000	146.000		760.960
Ni-59	.265	.037			.302
Ni-63	7,799.031	1,271.965	5,476.100		14,547.096
Np-237	.005	.001			.006
Pu-238	.229	.011	.031		.271
Pu-239	.335	.005	.029		.369
Pu-240	.327	.002			.329

Table B-1 (Continued)

Nuclide	Class AU	Class AS	Class B	Class C	Total
Pu-241	125.827	6.270	3.941		136.038
Ru-106	10.094				10.094
S-35	48.149				48.149
Sb-124	5,998.319	760.300			6,758.619
Sb-125	27.327	10.314	27.800		65.441
Sn-113	.051				.051
Sr-89	1.481				1.481
Sr-90	40.602	5.763	34.985		81.350
Tc-99	18.787	.469	.075		19.331
Te-125m			6.740		6.740
U-235		.001			.001
Xe-133	1.367				1.367
Zn-65	14,845.127	2,424.979			17,270.106
Zr-95	220.033	74.700	78.200		372.933
Total	1,153,123.284	279,531.088	199,801.129		1,632,455.501

Table B-2. Beatty 1988 Isotopic Distribution (mCi) by General Industry

<u>Nuclide</u>	<u>Class AU</u>	<u>Class AS</u>	<u>Class B</u>	<u>Class C</u>	<u>Total</u>
Ac-227	1.937				1.937
Ag-110m	8.228				8.228
Am-241	0.018				0.018
Ba-133	0.019				0.019
Bi-210	0.020				0.020
C-14	155.910				155.910
Ca-45	32.575				32.575
Cd-109	0.200				0.200
Ce-141	3.033				3.033
Cl-36	2.261				2.261
Cm-244			27.401		27.401
Co-57	3.259				3.259
Co-58	0.023				0.023
Co-60	191.435				191.435
Cr-51	11.701				11.701
Cs-134	0.036				0.036
Cs-137	133.577		524,000.000	524,133.577	
Fe-55	0.006				0.006
Fe-59	0.001				0.001
Gd-153	1.655				1.655
H-3	6,030.280				6,030.280
I-125	191.862				191.862
I-131	0.621				0.621
In-111	0.001				0.001
In-114	0.779				0.779
Mn-54	0.960				0.960
Na-22	3.049				3.049
Nb-95	1.722				1.722
Ni-63	13.674				13.674
P-32	171.689				171.689
Pb-210	0.638				0.638
Pm-147	0.001				0.001
Po-210	0.003				0.003
Ra-226	1,056.098				1,056.098
Ra-228	0.294				0.294
Rb-86	1.928				1.928
Ru-103	0.959				0.959
S-35	133.747				133.747
Sb-124	0.072				0.072

Table B-2 (Continued)

<u>Nuclide</u>	<u>Class AU</u>	<u>Class AS</u>	<u>Class B</u>	<u>Class C</u>	<u>Total</u>
Sb-125	0.003				0.003
Sc-46	6.962				6.962
Se-75	0.329				0.329
Sn-111	0.146				0.146
Sn-113	5.363				5.363
Sr-85	5.112				5.112
Sr-89	0.005				0.005
Sr-90	0.024				0.024
Tc-99	0.198				0.198
Th-232	0.032				0.032
Th-235	0.025				0.025
U-238	0.370				0.370
U-NAT	0.051				0.051
Zn-65	11.541				11.541
Total	8,184.432			524,027.401	532,211.833

Government

<u>Nuclide</u>	<u>Class AU</u>	<u>Class AS</u>	<u>Class B</u>	<u>Class C</u>	<u>Total</u>
Ag-110	3.150				3.150
Ag-110m	4.033				4.033
Am-241	0.001				0.001
Au-195			0.003		0.003
Ba-133	0.001		0.958		0.959
Ba-140	0.149				0.149
Bi-210	0.081				0.081
C-14	49.055				49.055
Ca-45	0.300				0.300
Ce-144	0.011				0.011
Cl-36	0.001				0.001
Co-57	0.034		0.367		0.401
Co-58	1,142.416				1,142.416
Co-60	1,295.028		0.006		1,295.034
Cr-51	9.971				9.971
Cs-134	0.503				0.503
Cs-136	0.018				0.018
Cs-137	16.256		3,123.120		3,139.376
Eu-152			0.001		0.001
Fe-55	1,294.792				1,294.792
Fe-59	9.550				9.550
Gd-153			3.000		3.000

Table B-2 (Continued)

<u>Nuclide</u>	<u>Class AU</u>	<u>Class AS</u>	<u>Class B</u>	<u>Class C</u>	<u>Total</u>
H-3	442.944		155.500		598.444
I-125	85.876		0.002		85.878
I-129			0.001		0.001
I-131	0.081				0.081
Mn-54	231.984				231.984
Mo-99	0.070				0.070
Na-22	0.023				0.023
Nb-95	1.817				1.817
Ni-63	346.422		8.000		354.422
Pa-234	0.001				0.001
Pb-210	0.026				0.026
Pm-147	0.400				0.400
Po-210	1.526				1.526
Ra-226	103.201				103.201
S-35	3.065				3.065
Sb-124	0.814				0.814
Sn-113	0.002				0.002
Sr-90	0.051		83.900		83.951
Ta-182	4.398				4.398
Tc-99	0.001				0.001
Th-232	0.550				0.550
Tl-204	0.030				0.030
U-238	65.506				65.506
Zn-65	7.185				7.185
Zr-95	2.012				2.012
Total	5,123.335		3,374.858		8,498.193

Hospitals

<u>Nuclide</u>	<u>Class AU</u>	<u>Class AS</u>	<u>Class B</u>	<u>Class C</u>	<u>Total</u>
Ba-133	1.100				1.100
C-14	98.389				98.389
Ca-45	0.492				0.492
Ce-141	0.060				0.060
Co-57	9.894				9.894
Co-60	24.000				24.000
Cr-51	47.413				47.413
Cs-137	0.790				0.790
Fe-59	6.000				6.000
Gd-153	0.001				0.001
H-3	123.389				123.389

Table B-2 (Continued)

<u>Nuclide</u>	<u>Class AU</u>	<u>Class AS</u>	<u>Class B</u>	<u>Class C</u>	<u>Total</u>
I-125	116.028				116.028
I-131	2.373				2.373
Na-22	0.570				0.570
P-32	120.772				120.772
Ra-226	4,337.065				4,337.065
Rb-86	1.306				1.306
S-35	67.102				67.102
Sc-46	0.088				0.088
Sr-85	2.640				2.640
Sr-90			44.300		44.300
Tc-99m	3.100				3.100
U-238	0.500				0.500
U-NAT	0.001				0.001
Total	4,963.073		44.300		5,007.373

Industry

<u>Nuclide</u>	<u>Class AU</u>	<u>Class AS</u>	<u>Class B</u>	<u>Class C</u>	<u>Total</u>
Ag-110	17.338				17.338
Ag-110m	12.949	1.000			13.949
Am-241	218.729	9.355	0.026	30.381	258.491
As-73	0.053				0.053
Au-195	0.068				0.068
Ba-133	5.270	0.300	0.008	0.003	5.581
Be-7	1.710				1.710
Bi-205	0.009				0.009
Bi-207	0.271				0.271
Bi-210	0.002				0.002
C-14	5,407.982	2.272	0.050	1,650.000	7,060.304
Ca-45	91.978	1.122			93.100
Cd-109	24.350	12.350	0.001		36.701
Ce-141	1.786	0.001			1.787
Ce-144	20.919		0.001		20.920
Cf-252			0.042		0.042
Cl-36	11.065				11.065
Cm-241	0.077				0.077
Cm-242	0.034				0.034
Cm-243	0.078				0.078
Co-57	1,851.201	0.683	1.078		1,852.962
Co-58	258.647				258.647
Co-60	38,602.527	43.569	118,010.710	197,000.025	353,656.831

Table B-2 (Continued)

<u>Nuclide</u>	<u>Class AU</u>	<u>Class AS</u>	<u>Class B</u>	<u>Class C</u>	<u>Total</u>
Cr-51	1,975.339				1,975.339
Cs-134	27.106				27.106
Cs-136	0.917				0.917
Cs-137	4,437.391	229.466	72,237.473	1,816,450.006	1,893,354.336
Dy-159	0.002				0.002
Eu-152	0.475				0.475
Eu-154	0.224				0.224
Eu-155	0.022				0.022
Fe-55	1,391.707	0.001	0.518		1,392.226
Fe-59	70.388				70.388
Ga-67	8.476				8.476
Gd-153	152.318				152.318
Ge-68	3.867				3.867
H-3	78,314.797	1,158.421	3,213,953.519		3,293,426.737
Hf-181	0.068				0.068
Hg-203	0.005				0.005
I-121	1.478				1.478
I-123	4.089				4.089
I-124	0.001				0.001
I-125	27,961.404	0.721			27,962.125
I-129	0.878				0.878
I-131	159.034				159.034
In-111	16.321				16.321
In-113	0.125				0.125
Ir-192	904.000	2.406			906.406
K-40	0.044				0.044
Kr-85	66,957.729		15.000		66,972.729
Mn-54	131.117	0.001	0.001		131.119
Mo-93	0.001				0.001
Mo-99	0.101				0.101
Na-22	34.210	0.084	0.001		34.295
Na-24	1.101				1.101
Nb-94	0.743				0.743
Nb-95	180.888				180.888
Nd-147	0.001				0.001
Ni-59	0.041				0.041
Ni-63	507.392	24.954	28.112		560.458
P-32	7,383.248				7,383.248
Pa-234	0.001				0.001
Pb-210	0.159	0.010	0.002		0.171
Pm-147	502.023	11.152			513.175
Po-210	2.517	9.992			12.509
Pr-147	0.001				0.001
Pt-195	5.000				5.000
Pu-238	17.642			60.000	77.642

Table B-2 (Continued)

Nuclide	Class AU	Class AS	Class B	Class C	Total
Pu-239	44.996				44.996
Pu-240	22.195				22.195
Pu-241	738.744				738.744
Pu-242	0.342				0.342
Ra-226	4,495.926	907.061	67.185	994.146	6,464.318
Rb-86	9.147				9.147
Ru-103	3.871				3.871
Ru-106	0.251		0.001		0.252
S-35	5,163.159	1.472			5,164.631
Sb-122	0.019				0.019
Sb-124	0.676				0.676
Sb-125	5.022				5.022
Sc-46	3.825				3.825
Sc-47	3.000				3.000
Se-75	7.736				7.736
Sm-151	0.004				0.004
Sn-113	5.601		0.001		5.602
Sn-119m	0.001				0.001
Sr-85	2.590				2.590
Sr-89	2.829				2.829
Sr-90	325.552		6,543.442	12,800.000	19,668.994
Ta-179	0.002				0.002
Ta-182	0.048				0.048
Tb-157	0.010				0.010
Tb-158	0.010				0.010
Tc-99	92.942				92.942
Tc-99m	3.008				3.008
Te-123	4.248				4.248
Te-125m	0.002				0.002
Te-129m	0.003				0.003
Th-228	0.168	0.001	0.020		0.189
Th-230	1.143	0.004			1.147
Th-232	25.889	1.194	1.078		28.161
Th-NAT	0.754				0.754
Tl-201	3.428	0.007			3.435
Tl-204	1.105	0.760	0.010		1.875
Tm-171	0.020				0.020
U-232	0.001				0.001
U-233	0.001				0.001
U-234	17.232				17.232
U-235	1.103	0.001		1.000	2.104
U-236	0.026				0.026
U-238	13,507.874	9.961		2.358	13,520.193
U-DEP	3.492				3.492
U-NAT	48.019		1.606		49.625

Table B-2 (Continued)

<u>Nuclide</u>	<u>Class AU</u>	<u>Class AS</u>	<u>Class B</u>	<u>Class C</u>	<u>Total</u>
W-178	6.792				6.792
Xe-127	0.027				0.027
Y-88	19.826				19.826
Y-90	9.481		0.001		9.482
Zn-65	64.987		0.011		64.998
Zr-95	85.519				85.519
Zr-97	0.021				0.021
Total	262,414.101	2,428.321	3,410,859.897	2,028,987.919	5,704,690.238

Utilities

<u>Nuclide</u>	<u>Class AU</u>	<u>Class AS</u>	<u>Class B</u>	<u>Class C</u>	<u>Total</u>
Ag-110m	48.273				48.273
Am-241	0.055				0.055
C-14	245.970	15.730	50.800		312.500
Ce-141	29.100				29.100
Ce-144	663.000				663.000
Cm-242	90.752	0.019			90.771
Cm-243	0.004				0.004
Cm-244	0.053				0.053
Co-57	5.791	5,859.942			5,865.733
Co-58	17,832.704	14,600.680	20,300.000		52,733.384
Co-60	312,803.860	229,150.488	6,778.000		548,732.348
Cr-51	37,979.140	179,265.312			217,244.452
Cs-134	7,577.676	122.221	43,360.000		51,059.897
Cs-136	23.060				23.060
Cs-137	13,657.993	550.091	82,890.000		97,098.084
Fe-55	722,000.185	512,108.093	5,416.000		1,239,524.278
Fe-59	324.595	231.577			556.172
H-3	5,857.725	442.906	34.690		6,335.321
I-129	22.950	0.028	0.001		22.979
I-131	957.166				957.166
Mn-54	99,079.859	61,715.919	5,647.000		166,442.778
Nb-95	58.760				58.760
Ni-59	0.141				0.141
Ni-63	3,983.091	208.769	10,800.000		14,991.860
P-32	2,657.730	13,469.042			16,126.772
Pu-238	0.100				0.100
Pu-239	0.068				0.068
Pu-240	0.004				0.004
Pu-241	187.717	0.937			188.654

Table B-2 (Continued)

<u>Nuclide</u>	<u>Class AU</u>	<u>Class AS</u>	<u>Class B</u>	<u>Class C</u>	<u>Total</u>
Ru-103	0.167				0.167
Ru-106	0.056				0.056
S-35	2.704				2.704
Sb-124	7,181.678	20.100			7,201.778
Sb-125	270.815	7.002			277.817
Sr-90	15.995	2.328			18.323
Tc-99	39.714	0.322	0.001		40.037
Te-125m	0.217				0.217
Zn-65	9,322.182	4,875.135			14,197.317
Zr-95	2.965				2.965
Total	1,242,924.015	1,022,646.641	175,276.492		2,440,847.148

Table B-3. Beatty 1989 Isotopic Distribution (mCi) by General Industry

<u>Nuclide</u>	<u>Class AU</u>	<u>Class AS</u>	<u>Class B</u>	<u>Class C</u>	<u>Total</u>
Ac-227	.374				.374
Ag-110	1.001				1.001
Ag-110m	15.891				15.891
Am-241	.589	10.316	.485	30.000	41.390
Au-198	.001				.001
Ba-133	1.386	.007			1.393
Ba-137	.009				.009
Ba-137m	.001				.001
Be-7	.020				.020
Bi-207	.010				.010
Bi-210	.001				.001
Bi-214	.001				.001
Br-85	.010				.010
C-14	1,022.470	.360			1,022.830
Ca-45	77.493	.001			77.494
Cd-109	20.133		.001		20.134
Cd-115	.001				.001
Ce-139	.001				.001
Ce-141	1.905	.039			1.944
Ce-144	.257				.257
Cf-252	.203				.203
Ci-36	14.910	.006			14.916
Cm-244	.003				.003
Co-56	.010				.010
Co-57	65.272		.001		65.273
Co-58	.817	.004			.821
Co-60	25,576.995	16.433	470.002	1.200	26,064.630
Cr-51	273.745		.001		273.746
Cs-134	.212	.052			.264
Cs-137	169.554	.220	3,578.087	974,800.000	978,547.861
Cu-67	.137				.137
Eu-152	.051				.051
Eu-154	.021				.021
Eu-155	.001				.001
Fe-55	8.922		.008		8.930
Fe-59	2.094				2.094
Ga-67	.576				.576
Gd-153	102.574	142.000	.009		244.583
Ge-68	12.956				12.956

Table B-3 (Continued)

<u>Nuclide</u>	<u>Class AU</u>	<u>Class AS</u>	<u>Class B</u>	<u>Class C</u>	<u>Total</u>
H-3	73,650.740	26.413	54,912.805		128,589.958
Hf-181	.007				.007
Hg-203	.063				.063
I-125	2,573.430	97.079	1.970		2,672.479
I-129	.001		.001		.002
I-131	26.192				26.192
In-111	5.441	.038			5.479
In-113	.010				.010
In-114	.133				.133
In-114m	.005				.005
Ir-192	3.162				3.162
Kr-85	98.821	60.000			158.821
Mn-54	1.877		.005		1.882
Na-22	96.124	.305	.001		96.430
Nb-93m	32.080				32.080
Nb-94	44.200				44.200
Nb-95	4.861	.039			4.900
Ni-63	146.317	2.000	9.985		158.302
P-32	3,474.866				3,474.866
Pa-233	.001				.001
Pa-234	.001				.001
Pb-210	.035	630.000	.001		630.036
Pm-147	.015				.015
Po-210	2.065	.313			2.378
Ra-226	1,893.444	66.845	241.177		2,201.466
Ra-228	.162				.162
Rb-86	1.549				1.549
Ru-103	.064	.016			.080
Ru-105		.023			.023
Ru-106	.005				.005
S-35	2,339.929	5.131			2,345.060
Sb-124	.007				.007
Sb-125	.103				.103
Sc-46	6.311	.042			6.353
Se-75	4.047				4.047
Sm-151	13.800				13.800
Sn-113	8.140	.051			8.191
Sr-85	9.569	.039			9.608
Sr-89	.525				.525
Sr-90	6.582	.001	68.648		75.231
Ta-182	.801				.801
Tc-99	196.883	3.752			200.635
Tc-99m	2.521				2.521
Th-230	.282	.010			.292
Th-232	2.385	.187	.010		2.582

Table B-3 (Continued)

<u>Nuclide</u>	<u>Class AU</u>	<u>Class AS</u>	<u>Class B</u>	<u>Class C</u>	<u>Total</u>
Th-NAT	.025				.025
Tl-201	.095				.095
Tl-204	1.448				1.448
U-238	19.174	2.823			21.997
U-NAT	.328		.160		.488
V-48	.010				.010
Xe-133	.001				.001
Y-90	5.001				5.001
Zn-65	55.485		.006		55.491
Total	112,099.730	1,064.545	59,283.363	974,831.200	1,147,278.838

Government

<u>Nuclide</u>	<u>Class AU</u>	<u>Class AS</u>	<u>Class B</u>	<u>Class C</u>	<u>Total</u>
Ag-110	.002				.002
Ag-110m	21.098	.020			21.118
Am-241	.149	.900	.107		1.156
Ba-133	.004				.004
Be-7	.001				.001
Bi-207	.003				.003
Bi-210	.002				.002
C-14	180.322		.002		180.324
Ca-45	.600				.600
Cd-109	.004				.004
Co-57	8.901				8.901
Co-58	1,322.111				1,322.111
Co-60	535.589	10.026	480.500		1,026.115
Cs-134	.597				.597
Cs-137	7.735	.061	1,398.608		1,406.404
Eu-152	.038	.038			.076
Eu-154	.497				.497
Eu-155	.477				.477
Fe-55	516.334				516.334
Fe-59	6.399				6.399
Gd-148	.001				.001
H-3	11,631.491	12,928.870	860,980.250		885,540.611
Hf-181	4.826				4.826
I-125	5.373				5.373
Kr-85	17,100.317				17,100.317
Mn-54	62.623				62.623
Na-22	5.474				5.474
Nb-95	6.266				6.266

Table B-3 (Continued)

<u>Nuclide</u>	<u>Class AU</u>	<u>Class AS</u>	<u>Class B</u>	<u>Class C</u>	<u>Total</u>
Ni-63	92.399				92.399
P-32	.101				.101
Pa-231	.014				.014
Pb-210	.002				.002
Pm-147	917.991	.086			918.077
Po-208	.003				.003
Po-210	1.002				1.002
Pu-239	2.306	1.225			3.531
Pu-240	.015				.015
Ra-226	541.110	25.615	13.597		580.322
S-35	3.110				3.110
Sb-125	.083				.083
Se-75	.020				.020
Sn-113	1.065				1.065
Sr-90	10.010		98.357		108.367
Tb-160	.003				.003
Tc-99	1.000				1.000
Th-228	1.000				1.000
Th-230			.005		.005
Th-232	.204	.405	.060		.669
Th-NAT	.625				.625
Tl-204		.090			.090
U-233	23.890	.190			24.080
U-235	.038				.038
U-238	1.644	5.908			7.552
U-DEP	9.000				9.000
U-NAT	1.323		.001		1.324
Zn-65	62.980	.076			63.056
Zr-95	2.645				2.645
Total	33,100.817	12,973.510	862,971.487		909,045.814

Hospitals

<u>Nuclide</u>	<u>Class AU</u>	<u>Class AS</u>	<u>Class B</u>	<u>Class C</u>	<u>Total</u>
Ag-110m	.008				.008
Am-241	4.028		.010		4.038
Au-198	.001				.001
Ba-133	2.322				2.322
C-14	314.988				314.988
Ca-45	15.691				15.691
Cd-109	1.028				1.028
Ce-141	.247				.247

Table B-3 (Continued)

<u>Nuclide</u>	<u>Class AU</u>	<u>Class AS</u>	<u>Class B</u>	<u>Class C</u>	<u>Total</u>
Ce-144	.600				.600
Cl-36	1.699				1.699
Co-57	196.024		.142	3.866	200.032
Co-58	.034				.034
Co-60	47,760.208				47,760.208
Cr-51	205.568				205.568
Cs-134	.049				.049
Cs-137	228.014		1,304.274		1,532.288
Eu-152	.003				.003
Eu-154	.001				.001
Fe-55	.100				.100
Fe-59	2.166				2.166
Ga-67	5.278				5.278
Gd-153	314.164				314.164
H-3	2,264.090	73.010			2,337.100
I-123	2.125				2.125
I-124	30.770				30.770
I-125	2,929.996	.005			2,930.001
I-129	.004				.004
I-131	35.115				35.115
In-111	99.145				99.145
Ir-192	717.212				717.212
Mn-54	.093				.093
Mo-99	2.125				2.125
Na-22	17.108	1.003			18.111
Nb-95	.020				.020
Ni-63	10.002				10.002
P-32	1,406.866				1,406.866
P-33	.016				.016
Pb-210	.006				.006
Ra-225	265.000				265.000
Ra-226	10,634.092	2,988.400	487.955	1.168	14,111.615
Rb-86	12.837				12.837
Ru-103	.011				.011
S-35	1,011.320	.004			1,011.324
Sb-125	.108				.108
Sc-46	.170				.170
Se-75	3.499				3.499
Sn-113	3.474				3.474
Sr-85	.330				.330
Sr-90	.070		314.893		314.963
Tc-99	64.483				64.483
Tc-99m	14.126				14.126
Th-232	.020	.164			.184
Tl-201	10.380				10.380

Table B-3 (Continued)

<u>Nuclide</u>	<u>Class AU</u>	<u>Class AS</u>	<u>Class B</u>	<u>Class C</u>	<u>Total</u>
Tl-204	.953				.953
U-238	12.772	.276			13.048
U-NAT	.163		.080		.243
Xe-133	.004				.004
Y-90	5.656				5.656
Zn-65	.725				.725
Total	68,607.107	3,062.862	2,107.354	5.034	73,782.357

Industry

<u>Nuclide</u>	<u>Class AU</u>	<u>Class AS</u>	<u>Class B</u>	<u>Class C</u>	<u>Total</u>
Ag-110	.002				.002
Ag-110m	127.084				127.084
Am-241	57.295	.003	1.424	3,858.958	3,917.680
Au-195	49.166				49.166
Ba-133	44.710	.005	.015		44.730
Ba-137	.001				.001
Bi-207	.008				.008
Bi-210	.305				.305
C-14	8,261.008	3.619	.010	16,153.792	24,418.429
Ca-45	102.067				102.067
Cd-109	135.396				135.396
Cd-113	.001				.001
Ce-141	5.541				5.541
Ce-144	.025	.091			.116
Cf-252	.034		.040		.074
Ci-36	4.581				4.581
Ci-38	.100				.100
Cm-242	.003				.003
Cm-243	.003				.003
Cm-244	.002				.002
Co-57	1,963.790	26.166	.001		1,989.957
Co-58	1.205	.015			1.220
Co-60	77,869.986	.269	10,600,933.272	40.000	10,678,843.527
Cr-51	326.718				326.718
Cs-134	64.264				64.264
Cs-136	.004				.004
Cs-137	9,543.729	319.817	180,372.643	1,799,346.201	1,989,582.390
Cu-67	.010				.010
Eu-152	.060				.060
Eu-154	2.049				2.049

Table B-3 (Continued)

<u>Nuclide</u>	<u>Class AU</u>	<u>Class AS</u>	<u>Class B</u>	<u>Class C</u>	<u>Total</u>
Fe-55	91.431				91.431
Fe-59	12.499				12.499
Ga-67	4.104				4.104
Gd-148		.001			.001
Gd-153	1.391				1.391
Ge-68	.151				.151
H-3	308,283.780	5,908.154	22,180,000.000	511,509.637	23,005,701.571
Hf-181	.023				.023
Hg-203	.006		.015		.021
I-123	.001				.001
I-125	21,876.216	.667			21,876.883
I-129	.143				.143
I-131	203.553				203.553
In-111	2.941				2.941
In-114	.579				.579
In-114m	.550				.550
Ir-192	18,905.652	3.002			18,908.654
Kr-85	19,847.978		1,000.000		20,847.978
Mn-54	19.915	.021	.015		19.951
Mo-99	.002				.002
Na-22	55.857	1.500	.015		57.372
Na-24	1.000				1.000
Nb-94	.018				.018
Nb-95	2.865	.003			2.868
Ni-59	.052				.052
Ni-63	2,775.274		65.367	4.677	2,845.318
Ni-65	10.000				10.000
Np-237	.020				.020
P-32	4,783.024				4,783.024
Pb-210	.002				.002
Pm-147	1,341.361		11.482		1,352.843
Po-210	549.527				549.527
Pt-193				.002	.002
Pu-238	3.809			60.000	63.809
Pu-239	11.937				11.937
Pu-240	5.938				5.938
Pu-241	194.438				194.438
Pu-242	.335				.335
Ra-226	4,862.351	2,940.324	27.492	15.499	7,845.666
Rb-83	.001				.001
Rb-86	24.348				24.348
Ru-103	2.949				2.949
Ru-106	.255	.027			.282
S-35	3,736.191	.028			3,736.219
Sb-124	.013				.013

Table B-3 (Continued)

<u>Nuclide</u>	<u>Class AU</u>	<u>Class AS</u>	<u>Class B</u>	<u>Class C</u>	<u>Total</u>
Sb-125	1.922	.047			1.969
Sc-46	10.648				10.648
Se-75	.307				.307
Sm-151	43.000				43.000
Sn-113	4.049	.002			4.051
Sn-119	.040				.040
Sn-125	.026				.026
Sr-85	4.541				4.541
Sr-90	664.417	4.032	13,872.368	32,000.000	46,540.817
Tc-99	48.190				48.190
Tc-99m	4.673				4.673
Te-123	.013				.013
Te-123m	.027				.027
Th-228		.018			.018
Th-230	.300	.011			.311
Th-232	1,003.041	4.863	.002		1,007.906
Th-NAT	.031				.031
Tl-201	6.279				6.279
Tl-204	48.327		1.775		50.102
U-234	3.978				3.978
U-235	1.103		.001		1.104
U-236	.054				.054
U-238	14,584.284	1.865	.002		14,586.151
U-DEP	334.920				334.920
U-NAT	13.611		.100		13.711
W-185	1.065				1.065
Xe-133	.001				.001
Y-88	.011		.015		.026
Y-90	42.254				42.254
Yb-169	.008				.008
Zn-65	5.405				5.405
Zr-95	20.507	.002			20.509
Total	503,018.659	9,214.552	32,976,286.054	2,362,988.766	35,851,508.031

Utilities

<u>Nuclide</u>	<u>Class AU</u>	<u>Class AS</u>	<u>Class B</u>	<u>Class C</u>	<u>Total</u>
Ag-110	65.439				65.439
Ag-110m	99.659		1,261.500		1,361.159
Am-241	1.030				1.030
As-76	.032				.032
Ba-133	.002				.002

Table B-3 (Continued)

<u>Nuclide</u>	<u>Class AU</u>	<u>Class AS</u>	<u>Class B</u>	<u>Class C</u>	<u>Total</u>
Ba-140	1.941				1.941
C-14	92.436	9.168	18.740	.518	120.862
Cd-109	.002				.002
Ce-141	4.742				4.742
Ce-144	49.513				49.513
Cm-242	3.127		.060		3.187
Cm-244	.337			.002	.339
Co-57	65.293	25.920			91.213
Co-58	19,449.148	23,645.124	319.500		43,413.772
Co-60	648,717.779	250,197.367	49,950.000	247,700.000	1,196,565.146
Cr-51	72,579.937	22,974.037	115.300		95,669.274
Cs-134	1,444.937	222.243	9,075.000	1.250	10,743.430
Cs-135	.063				.063
Cs-137	3,968.452	515.657	31,956.088	6.610	36,446.807
Cu-64	.001				.001
Fe-55	1,415,696.672	575,892.451	4,490.000	439,000.000	2,435,079.123
Fe-59	9,411.213	14,265.494			23,676.707
H-3	3,170.696	397.069	2.860	89,600.000	93,170.625
I-129	10.301	.026		.002	10.329
I-131	180.999				180.999
Mn-54	229,067.195	159,779.527	13,350.000	2,279.000	404,475.722
Nb-94				.002	.002
Nb-95	249.438				249.438
Ni-59				2,408.000	2,408.000
Ni-61	.360				.360
Ni-63	24,719.382	969.389	350.500	298,000.000	324,039.271
P-32		8,064.371			8,064.371
Pu-238	.538			.024	.562
Pu-239	.642			.002	.644
Pu-240				.002	.002
Pu-241	24.004		3.795	.060	27.859
Ra-226	217.909				217.909
Ru-103	22.278				22.278
Ru-106	2.351				2.351
Sb-124	183.074				183.074
Sb-125	272.213				272.213
Sr-89	8.128				8.128
Sr-90	79.690	22.140	17.050	.492	119.372
Tc-99	4.765	.774	.180	.002	5.721
U-238	.151				.151
Zn-65	14,317.290	6,736.222			21,053.512
Zr-95	148.301				148.301
Total	2,444,331.460	1,063,716.979	110,910.573	1,078,995.966	4,697,954.978

Table B-4. Richland 1987 Isotopic Distribution (mCi) by General Industry

Colleges

Nuclide	Class AU	Class AS	Class B	Class C	Total
Ac-227	.001				.001
Ag-110m	1.909				1.909
Am-241	.072				.072
Au-193	.202				.202
Ba-133	.958				.958
Be-7	2.007				2.007
Bi-207	5.050				5.050
Bi-210	.003				.003
Br-82	.004				.004
C-14	3,019.968				3,019.968
Ca-45	593.308				593.308
Cd-109	35.107				35.107
Cd-115	.100				.100
Ce-141	31.077				31.077
Ce-144	.001				.001
Cl-36	43.358				43.358
Co-57	80.645				80.645
Co-58	2.447				2.447
Co-60	189.808	1,040.700			1,230.508
Cr-51	1,845.424				1,845.424
Cs-134	.443				.443
Cs-137	28.880				28.880
Cu-64	.002				.002
Cu-67	1.565				1.565
Eu-152	12.145				12.145
Eu-154	2.061				2.061
Eu-155	.001				.001
Fe-55	36.229				36.229
Fe-59	42.575				42.575
Ga-67	5.416				5.416
Ga-68	.004				.004
Gd-153	6.168				6.168
Ge-68	4.405				4.405
H-3	51,161.506				51,161.506
Hf-181	.140				.140
Hg-203	1.287				1.287
I-123	47.856				47.856
I-124	.022				.022
I-125	9,567.213				9,567.213
I-129	.010				.010

Table B-4 (Continued)

<u>Nuclide</u>	<u>Class AU</u>	<u>Class AS</u>	<u>Class B</u>	<u>Class C</u>	<u>Total</u>
I-131	468.279				468.279
I-132	.800				.800
In-111	107.913				107.913
In-113m	.002				.002
In-114	.109				.109
In-114m	2.978				2.978
Ir-192	64.787				64.787
K-42	1.065				1.065
Kr-85	.050				.050
La-140	.003				.003
Mn-54	36.046				36.046
Mo-99	.500				.500
Na-22	318.907				318.907
Na-24	9.105				9.105
Nb-95	7.975				7.975
Ni-59		4,081.000			4,081.000
Ni-63	31.911	552.000			583.911
P-32	9,367.121				9,367.121
P-33	17.666				17.666
Pb-210	25.199				25.199
Pm-147	.008				.008
Po-209	.011				.011
Po-210	.731				.731
Pt-195	4.000				4.000
Ra-226	1.501		334.478		335.979
Rb-86	34.558				34.558
Ru-103	11.874				11.874
Ru-106	.001				.001
S-35	6,846.244				6,846.244
Sb-124	.193				.193
Sb-125	.392				.392
Sc-46	39.282				39.282
Sc-47	.003				.003
Se-75	27.775				27.775
Se-85	.001				.001
Sn-113	15.526				15.526
Sr-85	39.498				39.498
Sr-89	14.550				14.550
Sr-90	6.203				6.203
Ta-182	1.422				1.422
Tb-160	.001				.001
Tc-99	62.784				62.784
Tc-99m	37.631				37.631
Th-228	.049				.049
Th-232	.187				.187

Table B-4 (Continued)

<u>Nuclide</u>	<u>Class AU</u>	<u>Class AS</u>	<u>Class B</u>	<u>Class C</u>	<u>Total</u>
Th-NAT	.001				.001
Tl-201	26.320				26.320
Tl-204	.082				.082
U-235	.001				.001
U-238	5.858				5.858
U-NAT	.180				.180
Xe-133	.481				.481
Y-90	.103				.103
Yb-169	.058				.058
Zn-65	40.217				40.217
Zr-88	5.000				5.000
Zr-89	10.100				10.100
Total	84,492.619	5,673.700		334.478	90,500.797

Government

<u>Nuclide</u>	<u>Class AU</u>	<u>Class AS</u>	<u>Class B</u>	<u>Class C</u>	<u>Total</u>
Ag-110	.004				.004
Ag-110m	4.593				4.593
Am-241	.002			14.711	14.713
Ba-140	.042				.042
C-14	89.841				89.841
Cd-109	.002				.002
Ce-141	.043				.043
Ce-144	.042	.002			.044
Co-58	176.869				176.869
Co-60	3,545.695				3,545.695
Cr-51	12.257				12.257
Cs-134	.118				.118
Cs-137	.245	.002			.247
Eu-152	5.000				5.000
Fe-55	3,534.760				3,534.760
Fe-59	1.426				1.426
H-3	90,252.706		975,536.664		1,065,789.370
I-125	1.412				1.412
I-129	.045				.045
I-131	.042				.042
Kr-85	40.332				40.332
Mn-54	600.984				600.984
Nb-95	.098				.098
Nd-147	.042				.042

Table B-4 (Continued)

<u>Nuclide</u>	<u>Class AU</u>	<u>Class AS</u>	<u>Class B</u>	<u>Class C</u>	<u>Total</u>
Ni-63	216.792				216.792
P-32	9.876				9.876
Pa-233	.001				.001
Pm-147	6,314.599				6,314.599
Po-210	.005				.005
Pr-143	.041				.041
Pu-239	.050				.050
Ra-226	37.082	12.537		1,383.050	1,432.669
Ru-103	.042				.042
Ru-106	.043				.043
S-35	35.907				35.907
Sb-125	.001				.001
Sr-89	.042				.042
Sr-90	.240		12.150		12.390
Tc-99	.044				.044
Te-125m	.042				.042
Te-127m	.042				.042
Te-129m	.042				.042
Th-228	.018				.018
Th-232	.188				.188
U-235	.003				.003
U-238	1.642	.142			1.784
Xe-133	.018				.018
Y-91	.043				.043
Zn-65	3.171				3.171
Zr-95	.198				.198
Total	104,886.772	12.683	975,548.814	1,397.761	1,081,846.030

Hospitals

<u>Nuclide</u>	<u>Class AU</u>	<u>Class AS</u>	<u>Class B</u>	<u>Class C</u>	<u>Total</u>
Ag-111	.200				.200
Am-241	.164				.164
Ba-133	.012				.012
C-14	899.840	2.032			901.872
Ca-45	54.342	18.033			72.375
Ca-47	.101				.101
Cd-109	.753				.753
Ce-141	10.845				10.845
Cl-36	6.480	.084			6.564
Co-57	280.357	1.108	1.000		282.465

Table B-4 (Continued)

Nuclide	Class AU	Class AS	Class B	Class C	Total
Co-58	1.533				1.533
Co-60	.361				.361
Cr-51	2,138.642	.033			2,138.675
Cs-134	.500				.500
Cs-137	4.164		3.000		7.164
Cu-67	.002				.002
Eu-152	.900				.900
Fe-55	4.628				4.628
Fe-59	34.505				34.505
Ga-67	57.092				57.092
Gd-153	10.040				10.040
Gd-159	.030				.030
Ge-68	.380				.380
H-3	12,323.692	93.359			12,417.051
Hg-203	1.000				1.000
I-123	18.797				18.797
I-125	12,161.498	6.912			12,168.410
I-129	.154				.154
I-131	266.243				266.243
In-111	64.348				64.348
In-114m	3.760				3.760
Ir-192	267.861				267.861
Kr-85	.099				.099
Mn-54	.026	.029			.055
Mo-99	105.636				105.636
Na-22	19.277	.145			19.422
Nb-95	60.852				60.852
Ni-63	33.999				33.999
P-32	2,669.322	.311			2,669.633
Pb-203	.015				.015
Pb-210	1.638				1.638
Pm-147	1.885				1.885
Ra-226	.206		.005	845.165	845.376
Rb-86	50.380				50.380
Ru-103	49.861				49.861
S-35	2,260.255	9.469			2,269.724
Sc-46	49.297	.001			49.298
Se-75	5.941	.002			5.943
Sn-113	69.880	.001			69.881
Sn-119	8.000				8.000
Sr-85	14.456				14.456
Sr-89	15.808				15.808
Sr-90	1.230				1.230
Tc-99	47.401				47.401
Tc-99m	228.164				228.164

Table B-4 (Continued)

<u>Nuclide</u>	<u>Class AU</u>	<u>Class AS</u>	<u>Class B</u>	<u>Class C</u>	<u>Total</u>
Th-232	.002				.002
Tl-201	47.571				47.571
U-238	1.275				1.275
U-NAT	.021				.021
Xe-127	4.688				4.688
Xe-133	70.258				70.258
Y-90	1.000				1.000
Yb-169	7.847				7.847
Zn-65	1.933				1.933
Total	34,441.447	131.519	4.005	845.165	35,422.136

Industry

<u>Nuclide</u>	<u>Class AU</u>	<u>Class AS</u>	<u>Class B</u>	<u>Class C</u>	<u>Total</u>
Ac-228	.052				.052
Ag-110m	92.742				92.742
Am-241	26.086	.001		86.216	112.303
Am-243	.030				.030
Am-244	.008				.008
Au-195	41.762				41.762
Ba-133	117.593				117.593
Be-7	.643				.643
Bi-207	.090				.090
C-14	85,448.652	5.600		8,362.229	93,816.481
Ca-45	170.914				170.914
Ca-47	.013				.013
Cd-109	161.276				161.276
Ce-139	.017				.017
Ce-141	4.324				4.324
Ce-144	42.467				42.467
Cf-36	101.860				101.860
Cm-244	.009				.009
Co-57	2,459.431				2,459.431
Co-58	91.424				91.424
Co-59	5.000				5.000
Co-60	1,538.870		.080		1,538.950
Cr-51	2,385.606				2,385.606
Cs-133	5.000				5.000
Cs-134	74.472				74.472
Cs-137	4,761.137	70.000	6,719.994	129,975.000	141,526.131
Eu-152	11.030				11.030

Table B-4 (Continued)

Nuclide	Class AU	Class AS	Class B	Class C	Total
Eu-154	2.618				2.618
Eu-155	.798				.798
Fe-55	1,339.217				1,339.217
Fe-59	183.542				183.542
Ga-67	4.121				4.121
Ga-68	.266				.266
Gd-153	120.578				120.578
Ge-68	29.733				29.733
H-3	1,691,755.043		25,996,035.300	850,465.368	28,538,255.711
Hf-181	.003				.003
Hg-203	5.893				5.893
I-123	130.162				130.162
I-125	25,005.055				25,005.055
I-129	.674				.674
I-131	688.571		100.000		788.571
In-111	138.252				138.252
In-114	.002				.002
In-114m	.708				.708
Ir-192	10.940				10.940
K-40	.016				.016
Kr-85	9,461.888	20.000			9,481.888
Mn-54	58.976				58.976
Mo-99	.001				.001
Na-22	171.874				171.874
Na-24	.048				.048
Nb-94	.010				.010
Nb-95	11.597				11.597
Nb-97	2.055				2.055
Ni-59	1.180				1.180
Ni-63	3,554.748		9,266.000		12,820.748
Np-237	.007				.007
P-32	70,628.205				70,628.205
P-33	.075				.075
Pa-233	.007				.007
Pb-210	.988				.988
Pb-212	.059				.059
Pm-143	.001				.001
Pm-147	4,056.597				4,056.597
Po-210	46.437				46.437
Pu-238	5.005			1.500	6.505
Pu-239	29.449			14.710	44.159
Pu-240	14.514			6.210	20.724
Pu-241	443.645			180.010	623.655
Pu-242	.275				.275
Ra-226	250.637	2.974	3.500	50.000	307.111

Table B-4 (Continued)

<u>Nuclide</u>	<u>Class AU</u>	<u>Class AS</u>	<u>Class B</u>	<u>Class C</u>	<u>Total</u>
Rb-83	19.000				19.000
Rb-86	6.947				6.947
Re-184	.020				.020
Ru-103	13.423				13.423
Ru-106	9.774				9.774
S-35	72,486.816				72,486.816
Sb-124	2.960				2.960
Sb-125	14.393				14.393
Sc-46	6.588				6.588
Se-75	36.632				36.632
Si-32	.005				.005
Sn-113	161.926				161.926
Sn-119	8.126				8.126
Sr-85	5.237				5.237
Sr-89	.086				.086
Sr-90	102.558		880.000		982.558
Sr-92	.660				.660
Ta-182	2.844				2.844
Tb-158	.037				.037
Tc-99	174.683				174.683
Tc-99m	19.103				19.103
Te-123m	28.000				28.000
Th-228	.165				.165
Th-229	.004				.004
Th-230	.140				.140
Th-232	74.139				74.139
Th-NAT	9,859.249	494.290			10,353.539
Tl-201	.505				.505
Tl-202	2.234				2.234
Tl-204	8.628				8.628
Tl-208	.077				.077
U-234	19.492			.350	19.842
U-235	65.253			.026	65.279
U-236	.078				.078
U-238	28,571.929			.085	28,572.014
U-NAT	2,849.764				2,849.764
Xe-133	.037				.037
Y-88	.406				.406
Y-90	26.820				26.820
Yb-169	.012				.012
Zn-65	8,964.528				8,964.528
Zr-95	.257				.257
Zr-97	.075				.075
Total	2,029,238.588	592.865	26,013,004.874	989,141.704	29,031,978.031

Table B-4 (Continued)

Utilities

Nuclide	Class AU	Class AS	Class B	Class C	Total
Ag-110	17.169	.110			17.279
Ag-110m	9,877.715	3,007.644	4,780.870	1,432.000	19,098.229
Am-241	51.419	4.329	16.058	23.074	94.880
Am-243	.004			.001	.005
Ba-133	.009				.009
Ba-140	1,173.692	1.615	4,650.874	372.300	6,198.481
Be-7	6.298		9,347.936		9,354.234
Bi-207	.003				.003
C-14	6,891.362	580.046	1,074.516	184.047	8,729.971
Cd-109	8,339.144	.038			8,339.182
Ce-141	156.323		516.485		672.808
Ce-144	2,414.287	580.810	639.962	772.400	4,407.459
Cm-242	22.246	6.734	48.096	34.184	111.260
Cm-243	2.387	.003	19.831	.162	22.383
Cm-244	1.991	4.752	5.216	.497	12.456
Co-56		.010			.010
Co-57	433.008	67.781	3,310.996		3,811.785
Co-58	91,066.418	12,178.880	872,760.100	90,310.000	1,066,315.398
Co-60	306,105.649	32,449.818	326,724.382	6,598,886.000	7,264,165.849
Cr-51	73,935.470	4,012.013	120,485.222	6,570.000	205,002.705
Cs-127		.150			.150
Cs-131	1.730				1.730
Cs-134	17,076.575	5,490.063	344,230.000	36,468.000	403,264.638
Cs-136	47.913				47.913
Cs-137	56,430.021	13,696.475	801,350.051	68,353.200	939,829.747
Eu-154	.002				.002
Eu-155	41.816		9.060	42.600	93.476
Fe-55	142,082.530	20,731.898	319,609.214	4,603,096.500	5,085,520.142
Fe-59	1,888.396	21.475	9,536.400		11,446.271
H-3	59,108.200	6,251.885	14,497.324	932.000	80,789.409
Hf-181	173.672				173.672
I-125	.080				.080
I-129	177.246	9.528	22.796	98.703	308.273
I-131	2,294.351	.012	19,759.303		22,053.666
I-133	101.328		2.930		104.258
I-135	1.140				1.140
Kr-85	.090				.090
La-140	1,675.680	.865	6,125.340		7,801.885
Mn-54	49,907.399	9,882.747	116,464.060	315,322.700	491,576.906
Mo-99	.128				.128
Na-24	.853				.853
Nb-94				.644	.644
Nb-95	45,362.637	720.569	284.138	1,619.038	47,986.382

Table B-4 (Continued)

Nuclide	Class AU	Class AS	Class B	Class C	Total
Nb-97	8.498				8.498
Ni-59	629.577	27.840	116.350	5,140.000	5,913.767
Ni-63	32,161.938	4,753.726	117,199.983	169,961.100	324,076.747
Ni-63AM				167,647.000	167,647.000
Ni-65	6.640				6.640
Np-237	1.426			.031	1.457
Pb-210	.002				.002
Pb-214	.210				.210
Pm-147	9,595.763		204.902	559.500	10,360.165
Pu-238	10.115	7.605	26.573	2.026	46.319
Pu-239	34.482	8.955	26.673	14.531	84.641
Pu-240	8.441	.008	1.260	7.675	17.384
Pu-241	2,141.829	326.793	1,542.694	1,199.960	5,211.276
Pu-242	1.482			.031	1.513
Ra-226	.040			75.000	75.040
Ru-103	44.363	53.560	.276	942.000	1,040.199
Ru-106	2,185.847		40.413	157.800	2,384.060
Sb-122	.057				.057
Sb-124	5,575.357	80,996.282	64,756.000		151,327.639
Sb-125	40,154.481	307.622	6,145.230	616.000	47,223.333
Sn-113	1,577.638	6.970	1,524.600		3,109.208
Sr-89	474.097	1.670	9,474.890	300.000	10,250.657
Sr-90	18,095.243	61.901	27,591.043	6,628.693	52,376.880
Sr-91	23.110				23.110
Sr-92	57.009				57.009
Sr-95	.566				.566
Ta-182	.016				.016
Tc-99	250.852	16.830	42.392	133.252	443.326
Tc-99m	.439				.439
Te-125m	9,131.406	1.121	639.952	26.700	9,799.179
U-232				.002	.002
U-233				.002	.002
U-234	.596		.058	.294	.948
U-235	.670		.008	.009	.687
U-236				.002	.002
U-238	.720		.018	.043	.781
Xe-131m	4.331				4.331
Xe-133	39.558				39.558
Zn-63	.370				.370
Zn-65	705,168.100	1,021.634	32,604.610		738,794.344
Zr-95	25,529.244	186.410	209.315	635.000	26,559.969
Zr-97	1.470				1.470
Total	1,729,782.364	197,479.167	3,238,418.400	12,078,564.701	17,244,244.632

Table B-5. Richland 1988 Isotopic Distribution (mCi) by General Industry

Colleges

Nuclide	Class AU	Class AS	Class B	Class C	Total
Ag-108	.001				.001
Ag-108m	.001				.001
Ag-110	.002				.002
Ag-110m	18.486				18.486
Am-241	3.034				3.034
Am-247	.073				.073
Au-195	.005				.005
Ba-133	10.012				10.012
Be-7	.034				.034
Bi-205	.002				.002
Bi-207	.019				.019
Bi-210	.002				.002
C-14	2,851.595				2,851.595
Ca-45	691.443				691.443
Ca-47	.005				.005
Cd-107	.011				.011
Cd-109	6.620				6.620
Ce-141	22.205				22.205
Ce-144	.211				.211
Cf-252	.144				.144
Cl-36	159.582				159.582
Co-57	99.368				99.368
Co-58	1.449				1.449
Co-60	41.716	406.550			448.266
Cr-51	1,304.106				1,304.106
Cs-134	.098	1.600			1.698
Cs-137	155.635				155.635
Cu-64	.011				.011
Cu-67	.015				.015
Eu-152	4.877	95.760			100.637
Eu-154	6.447	11.170			17.617
Eu-155	.518				.518
Fe-55	10.762				10.762
Fe-59	16.051				16.051
Ga-67	.363				.363
Ga-68	.001				.001
Gd-153	10.993				10.993
Ge-68	17.590				17.590
H-3	97,009.756				97,009.756

Table B-5 (Continued)

Nuclide	Class AU	Class AS	Class B	Class C	Total
Hf-181	.003				.003
Hg-203	1.205				1.205
I-121	.003				.003
I-123	2.374				2.374
I-125	7,563.139				7,563.139
I-126	.005				.005
I-129	.224				.224
I-131	394.754				394.754
In-111	21.162				21.162
In-113	.008				.008
In-114	2.275				2.275
In-114m	.664				.664
Ir-192	.121				.121
K-42	.001				.001
Kr-85	1.010				1.010
Mn-54	3.683	3.820			7.503
Mn-57	.001				.001
Na-22	463.762				463.762
Na-24	34.088				34.088
Nb-95	6.436				6.436
Ni-63	69.010				69.010
P-32	6,630.959				6,630.959
P-33	1.000				1.000
Pa-233	.007				.007
Pb-210	18.932				18.932
Pm-147	.001				.001
Po-210	.712				.712
Pu-239	.002				.002
Pu-241	.197				.197
Ra-224	.010				.010
Ra-226	3.700				3.700
Rb-86	56.542				56.542
Ru-103	13.515				13.515
Ru-106	.090				.090
S-35	9,520.375				9,520.375
Sb-122	.002				.002
Sb-124	.055				.055
Sb-125	.020				.020
Sc-46	38.903				38.903
Sc-47	.001				.001
Sc-50	.001				.001
Se-75	18.164				18.164

Table B-5 (Continued)

Nuclide	Class AU	Class AS	Class B	Class C	Total
Sn-113	26.640				26.640
Sr-85	30.613				30.613
Sr-90	1.887		35.550		37.437
Ta-182	.830				.830
Tc-99	38.065				38.065
Tc-99m	177.609				177.609
Te-123	.001				.001
Th-228	.117				.117
Th-230	.001				.001
Th-232	.754				.754
Th-NAT	.042				.042
Tl-201	19.851				19.851
Tl-202	1.100				1.100
Tl-204	3.806				3.806
U-232	.401				.401
U-235	.025				.025
U-238	10.800				10.800
U-NAT	21.208				21.208
W-181	.001				.001
W-188	.001				.001
Xe-133	.106				.106
Y-88	.032				.032
Y-90	.025				.025
Zn-65	37.630				37.630
Zr-85	.001				.001
Zr-89	5.000				5.000
Zr-95	.089				.089
Total	127,686.994	518.900	35.550		128,241.444

Government

Nuclide	Class AU	Class AS	Class B	Class C	Total
Ag-110m	.476				.476
Am-241	4.094	.001			4.095
As-73	.909				.909
Au-195	.051				.051
Ba-133	.040				.040
Bi-210		.001			.001
C-14	248.519	394.000			642.519

Table B-5 (Continued)

Nuclide	Class AU	Class AS	Class B	Class C	Total
Ca-45	.982				.982
Cd-109	.376				.376
Ce-141	.001				.001
Ce-144	.001	.001			.002
Cl-36	.875				.875
Co-37	84.489				84.489
Co-58	443.714	984.000			1,427.714
Co-60	8,879.876	19,680.300			28,560.176
Cr-51	1.200				1.200
Cs-134	.012				.012
Cs-137	4.334				4.334
Eu-152	.133				.133
Eu-154	.130				.130
Fe-55	8,873.523	19,680.000			28,553.523
Fe-59	3.289				3.289
H-3	70,350.204	3.000	111,236.000		181,589.204
I-125	14.452				14.452
I-129	.002	.004			.006
I-131	.001				.001
Kr-85	74.752				74.752
Mn-54	1,508.151	3,346.000			4,854.151
Na-22	.003	.001			.004
Ni-59		.140			.140
Ni-63	508.917	984.000			1,492.917
P-32	3.254				3.254
Pb-210	.014				.014
Pm-145		.001			.001
Pm-147	174.731				174.731
Po-210	.122				.122
Pt-193		.001			.001
Pu-239	.040	.348			.388
Ra-226	42.574	.140	.016	428.990	471.720
Re-187	.001				.001
S-35	1.186				1.186
Se-75	.100				.100
Sm-145		.001			.001
Sr-90	2.888	.001			2.889

Table B-5 (Continued)

Nuclide	Class AU	Class AS	Class B	Class C	Total
Tc-99	.002	.005			.007
Th-232	1.770				1.770
Th-NAT	2.198				2.198
Tl-204		.001			.001
U-233	.001				.001
U-234		.001			.001
U-235	.001				.001
U-238	5.896	1.972			7.868
U-NAT	1.044				1.044
Zn-65	1.490				1.490
Total	91,240.817	45,073.919	111,236.016	428.990	247,979.742

Hospitals

Nuclide	Class AU	Class AS	Class B	Class C	Total
Ag-110m	40.448				40.448
Ba-133	.020				.020
C-14	858.685				858.685
Ca-45	70.795				70.795
Ca-47	.253				.253
Cd-109	.443				.443
Ce-141	27.938				27.938
Cl-36	14.444				14.444
Co-57	369.835				369.835
Co-58	.307				.307
Co-60	.443				.443
Cr-51	2,127.664				2,127.664
Cs-137	.452				.452
Fe-55	2.868				2.868
Fe-59	22.876				22.876
Ga-67	63.111				63.111
Gd-153	1.663				1.663
Ge-68	.001				.001
H-3	53,957.110				53,957.110
Hg-203	8.900				8.900
I-123	29.686				29.686
I-125	9,423.215				9,423.215
I-129	.030				.030
I-131	241.596				241.596
In-111	67.981				67.981

Table B-5 (Continued)

Nuclide	Class AU	Class AS	Class B	Class C	Total
In-114	.720				.720
In-114m	.440				.440
Ir-192	4.272				4.272
Mn-54	.555				.555
Mo-99	7.640				7.640
Na-22	33.813				33.813
Nb-88	.010				.010
Nb-93	.004				.004
Nb-95	17.072				17.072
P-32	3,502.912				3,502.912
P-33	2.750				2.750
Pb-203	.001				.001
Pb-210	.025				.025
Po-208	.001				.001
Po-210	.002				.002
Ra-226	.437				.437
Rb-83	.362				.362
Rb-86	54.805				54.805
Ru-103	16.228				16.228
S-35	2,226.335				2,226.335
Sc-46	37.500				37.500
Sc-47	.004				.004
Se-75	4.109				4.109
Sn-113	42.330				42.330
Sn-119	4.500				4.500
Sr-81	.001				.001
Sr-85	15.275				15.275
Sr-89	.017				.017
Sr-90	21.920				21.920
Tc-99	12.050				12.050
Tc-99m	1,241.075				1,241.075
Th-232	.003				.003
Tl-201	364.602				364.602
Tl-210	.002				.002
U-238	.006				.006
Xe-127	13.256				13.256
Xe-131	81.600				81.600
Xe-133	810.554				810.554
Y-90	1.750				1.750
Yb-169	.280				.280
Zn-65	1.152				1.152
Total	75,851.134				75,851.134

Table B-5 (Continued)

Industry

Nuclide	Class AU	Class AS	Class B	Class C	Total
Ag-108m	10.121				10.121
Ag-110	.016				.016
Ag-110m	12.212				12.212
Am-241	136.767			30.000	166.767
Au-195	1.369				1.369
Ba-133	25.535				25.535
Ba-140	.001				.001
Be-7	.018				.018
Bi-207	.438				.438
Bi-210	.011				.011
C-14	69,594.362	2.000		3,298.404	72,894.766
Ca-45	441.273				441.273
Ca-47	.004				.004
Cd-109	219.537				219.537
Cd-115	.001				.001
Ce-139	.063				.063
Ce-141	4.148				4.148
Ce-144	4.097				4.097
Cf-252	.702				.702
Cl-36	150.459				150.459
Cm-242	.099				.099
Cm-244	.060				.060
Co-56	.795				.795
Co-57	1,162.168				1,162.168
Co-58	124.556				124.556
Co-60	2,926.599	.005	12.800	457.632	3,397.036
Cr-51	2,641.716				2,641.716
Cs-134	4.153				4.153
Cs-137	215.134	.001	950.600		1,165.735
Cu-67	.001				.001
Dy-165	.100				.100
Eu-152	.649				.649
Eu-154	1.263				1.263
Eu-155	.027				.027
Fe-55	4,360.808	.700		71.848	4,433.356
Fe-59	7.945				7.945
Ga-67	3.501				3.501
Ga-68	1.012				1.012
Gd-153	138.317				138.317
Ge-68	7.337				7.337
H-3	2,143,680.626	338.300	20,715,000.000	.003	22,859,018.929

Table B-5 (Continued)

Nuclide	Class AU	Class AS	Class B	Class C	Total
Hf-181	.065				.065
Hg-203	.145				.145
I-121	.001				.001
I-123	.004				.004
I-125	24,372.383				24,372.383
I-129	.288			.001	.289
I-131	355.429				355.429
I-137	.400				.400
In-111	66.834				66.834
In-114	.001				.001
In-114m	.575				.575
Ir-192	93.399				93.399
K-40	.085				.085
Kr-85	5,216.400				5,216.400
Mn-54	236.239				236.239
Na-22	107.940				107.940
Na-24	.043				.043
Nb-94	.721				.721
Nb-95	26.583				26.583
Ni-59	3.344				3.344
Ni-63	4,160.104				4,160.104
P-32	62,902.193				62,902.193
P-33	.931				.931
Pa-234	.001				.001
Pb-203	.001				.001
Pb-210	.012				.012
Pb-212	.002				.002
Pm-147	1,014.601				1,014.601
Po-210	786.955				786.955
Pu-236	.010				.010
Pu-238	2.627				2.627
Pu-239	2.773				2.773
Pu-240	.604				.604
Pu-241	12.628				12.628
Pu-242	.063				.063
Ra-226	121.998	.010		146.400	268.408
Ra-228	.014				.014
Rb-83	18.000				18.000
Rb-86	13.192				13.192
Rh-106	.130				.130
Ru-103	3.984				3.984
Ru-106	5.091			6.900	11.991
S-35	89,104.664				89,104.664
Sb-122	.380				.380
Sb-124	.768				.768

Table B-5 (Continued)

Nuclide	Class AU	Class AS	Class B	Class C	Total
Sb-125	7.373				7.373
Sc-46	65.239				65.239
Se-75	6.230				6.230
Sn-113	54.440				54.440
Sn-119	.001				.001
Sn-119m	185.915				185.915
Sr-85	14.556				14.556
Sr-89	9.279				9.279
Sr-90	23.395	.005	1,410.101		1,433.501
Ta-182	.737				.737
Tc-99	435.565			.002	435.567
Tc-99m	48.181				48.181
Te-123	16.018				16.018
Te-123m	40.000				40.000
Te-125	4.645				4.645
Th-228	.775				.775
Th-229	.010				.010
Th-230	.042				.042
Th-232	498.862	.014			506.876
Th-NAT	21,496.816				21,496.816
Tl-201	.004				.004
Tl-202	2.020				2.020
Tl-204	1.777				1.777
Tl-208	.004				.004
U-234	.232				.232
U-235	62.855				62.855
U-236	.002				.002
U-238	13,943.093	.400			13,943.493
U-NAT	3,274.500				3,274.500
Xe-133	1.813				1.813
Y-88	3.335				3.335
Y-90	11.792				11.792
Yb-169	.009				.009
Zn-65	680.084				680.084
Zr-95	5.644				5.644
Total	2,455,405.848	341.435	20,717,373.501	4,011.190	23,177,131.974

Utilities

Nuclide	Class AU	Class AS	Class B	Class C	Total
Ag-110	.290				.290
Ag-110m	7,961.546	13,129.750	48,918.000	36,931.558	106,940.850

Table B-5 (Continued)

Nuclide	Class AU	Class AS	Class B	Class C	Total
Am-241	26.801	.206	3.551	68.332	98.890
Ba-140	289.460	111.000	.005		400.465
Be-7	14.094			207.876	221.970
C-14	9,126.203	343.888	1,497.381	1,808.462	12,775.934
Cd-109	6.960				6.960
Ce-141	507.520	.191		26.660	534.371
Ce-144	2,179.689	8.230	1,451.566	4,618.125	8,257.610
Cm-242	21.629	1.409	1.462	4.556	29.056
Cm-243	.360	.025	.008	.006	.399
Cm-244	1.678	.158	.662	1.542	4.040
Co-57	65.907	233.362	779.735	427.988	1,506.992
Co-58	50,194.930	53,901.732	144,802.634	107,887.901	356,787.197
Co-60	245,364.479	113,518.270	180,542.399	196,826.301	736,251.449
Cr-51	82,413.605	40,559.004	2,506.975	8,064.042	133,543.626
Cs-134	29,946.702	2,529.114	295,065.723	774,813.865	1,102,355.404
Cs-136	35.323		.005		35.328
Cs-137	56,770.795	3,478.619	545,576.203	2,147,759.250	2,753,584.867
Cs-144	2.469				2.469
Eu-154	.604				.604
Eu-155	42.896		4.510	104.260	151.666
Fe-55	145,423.024	150,314.112	275,391.274	225,283.268	796,411.678
Fe-59	6,007.774	1,853.800	44.399	401.903	8,307.876
H-3	30,256.864	382.815	2,845.467	2,215.005	35,700.151
Hf-181	59.901		4.760		64.661
I-125	.002				.002
I-129	28.503	.265	3.054	18.024	49.846
I-131	1,518.550	153.700	6,657.291	3,520.000	11,849.541
I-133	2.000				2.000
La-140	380.224	120.000	.006	592.000	1,092.230
Mn-54	72,585.635	10,643.784	35,565.825	49,543.825	168,339.069
Mo-99	.133				.133
Nb-94	3.239				3.239
Nb-95	11,887.953	7,505.220	5,382.517	5,412.697	30,188.387
Ni-59	9.156	44.146	217.006	34.847	305.155
Ni-63	15,565.808	9,744.790	59,936.459	164,952.363	250,199.420
Pm-147	5,464.464		162.690	153,302.600	158,929.754
Pu-238	5.982	.372	1.370	13.230	20.954
Pu-239	25.435	.390	4.814	79.136	109.775
Pu-240	7.827	.014	1.140	22.107	31.088
Pu-241	797.626	37.335	220.852	2,439.680	3,495.493
Pu-242	.574		1.900	.015	2.489
Ru-103	15.922		.008	.823	16.753

Table B-5 (Continued)

Nuclide	Class AU	Class AS	Class B	Class C	Total
Ru-106	1,280.224		18.439	7,854.050	9,152.713
Sb-122	.075				.075
Sb-124	9,412.659	3,350.200	69,310.900	1,130.400	83,204.159
Sb-125	17,001.193	569.755	4,960.580	5,724.925	28,256.453
Se-75	.274				.274
Sn-113	326.188	283.000	670.778	25.623	1,305.589
Sr-89	90.500	18.776	553.076	2,381.243	3,043.595
Sr-90	13,130.881	16.923	346,587.638	714,605.644	1,074,341.086
Sr-92	5.420				5.420
Tc-99	133.441	3.538	24.418	425.147	586.544
Tc-99m	.059				.059
Te-125	.309				.309
Te-125m	4,508.682	19.700	717.100	820.010	6,065.492
Th-230			.001		.001
U-233	.002				.002
U-234	.549		.022	.714	1.285
U-235	.569		.011	4.605	5.185
U-238	.572		.015	.231	.818
Xe-131			.039		.039
Xe-131m	13.299	4.925	.152	14.100	32.476
Xe-133	10.200				10.200
Y-90	1.483				1.483
Zn-65	350,778.338	57,218.410	128,618.677	30.216	536,645.641
Zr-95	6,270.535	5,432.230	2,653.078	2,790.610	17,146.453
Zr-97	.060				.060
Total	1,178,056.048	475,533.158	2,161,706.512	4,623,189.765	8,438,485.483

Table B-6. Richland 1989 Isotopic Distribution (mCi) by General Industry

Colleges

Nuclide	Class AU	Class AS	Class B	Class C	Total
Ag-105	0.002				0.002
Ag-110	175.044				175.044
Ag-110m	54.469				54.469
Am-241	3.812				3.812
Am-243	0.001				0.001
As-73	0.510				0.510
Au-195	0.020				0.020
Ba-133	4.186				4.186
Ba-140	0.001				0.001
Bi-205	0.014				0.014
Bi-206	0.025				0.025
Bi-207	0.001				0.001
Bi-210	0.001				0.001
Br-82	0.002				0.002
C-14	3,058.166		299.963		3,358.129
C-15	0.060				0.060
Ca-45	519.542				519.542
Ca-47	0.076				0.076
Cd-109	6.573				6.573
Cd-115	0.011				0.011
Ce-137	2.793				2.793
Ce-141	346.187				346.187
Ce-144	3.535				3.535
Cf-252	0.002				0.002
Cl-36	38.737				38.737
Co-56	0.036				0.036
Co-57	189.974				189.974
Co-58	0.153				0.153
Co-60	1,913.323				1,913.323
Cr-51	2,715.880				2,715.880
Cs-134	5.124				5.124
Cs-137	26.663				26.663
Cs-141	0.001				0.001
Cu-64	0.007				0.007
Cu-67	3.203				3.203
Eu-151	0.001				0.001
Eu-152	15.925				15.925
Eu-154	1.856				1.856
Eu-155	0.083				0.083
Fe-55	37.251				37.251

Table B-6 (Continued)

Nuclide	Class AU	Class AS	Class B	Class C	Total
Fe-59	25.188				25.188
Ga-67	0.522				0.522
Ga-68	7.008				7.008
Gd-153	15.509				15.509
Ge-68	23.856				23.856
H-3	107,526.697			3.133	107,529.830
Hf-175	0.002				0.002
Hf-181	0.521				0.521
Hg-203	0.265				0.265
I-123	0.046				0.046
I-125	10,794.371				10,794.371
I-129	0.032				0.032
I-131	1,184.105				1,184.105
In-111	1.925				1.925
In-113	0.072				0.072
In-114	5.054				5.054
In-11nm	0.858				0.858
Ir-192	0.002				0.002
La-140	0.012				0.012
Mn-51	0.001				0.001
Mn-54	135.419				135.419
Mo-99	3.552				3.552
Na-22	140.221				140.221
Na-24	0.015				0.015
Nb-95	554.804				554.804
Nb-96	0.010				0.010
Ni-63	154.562				154.562
P-32	8,050.017				8,050.017
P-33	3.311				3.311
Pa-231	0.003				0.003
Pb-206	0.010				0.010
Pb-210	0.547				0.547
Pm-147	1.415				1.415
Po-208	0.010				0.010
Po-209	0.011				0.011
Po-210	12.078				12.078
Pu-239	0.054				0.054
Pu-241	0.043				0.043
Ra-226	3.313			10.000	13.313
Rb-86	57.921				57.921
Rb-95	0.001				0.001
Re-187	0.002				0.002
Ru-103	199.169				199.169
S-35	14,034.785				14,034.785
Sb-124	0.729				0.729

Table B-6 (Continued)

<u>Nuclide</u>	<u>Class AU</u>	<u>Class AS</u>	<u>Class B</u>	<u>Class C</u>	<u>Total</u>
Sb-125	0.017				0.017
Sc-41	0.108				0.108
Sc-46	538.629				538.629
Sc-50	0.010				0.010
Se-75	2,386.658				2,386.658
Sm-153	31.410				31.410
Sn-113	31.398				31.398
Sn-117	0.076				0.076
Sn-119m	0.001				0.001
Sr-85	592.347				592.347
Sr-89	5.222				5.222
Sr-90	15.373				15.373
Sr-95	0.002				0.002
Ta-179	0.002				0.002
Ta-182	0.974				0.974
Tb-157	0.002				0.002
Tb-158	0.002				0.002
Tc-99	83.032				83.032
Tc-99m	81.028				81.028
Te-132	0.001				0.001
Th-227	0.010				0.010
Th-228	0.064				0.064
Th-230	0.001				0.001
Th-232	1.235				1.235
Th-NAT	0.024				0.024
Tl-201	49.533				49.533
Tl-204	3.455				3.455
Tm-170	0.010				0.010
U-233	0.011				0.011
U-235	0.041				0.041
U-238	10.338				10.338
U-NAT	3.920				3.920
W-181	0.030				0.030
Xe-133	4.040				4.040
Y-88	1.370				1.370
Y-90	0.082				0.082
Zn-65	182.603				182.603
Zr-95	0.105				0.105
Total	156,084.462			313.096	156,397.558

Table B-6 (Continued)

Government

Nuclide	Class AU	Class AS	Class B	Class C	Total
Am-241	0.665	0.425		25.000	26.090
As-73	0.020				0.020
Ba-133	1.017				1.017
Bi-204	5.000				5.000
Bi-207	1.100				1.100
C-14	110.041				110.041
Ca-45	1.632				1.632
Cd-109	0.198				0.198
Ce-141	0.003				0.003
Ce-144	0.003				0.003
Cf-252	0.005				0.005
Cm-244	0.505				0.505
Co-56	0.466				0.466
Co-57	0.062				0.062
Co-58	46.884				46.884
Co-60	956.101				956.101
Cr-51	1.067				1.067
Cs-134	0.016				0.016
Cs-137	1.721				1.721
Eu-154	0.003				0.003
Eu-155	0.001				0.001
Fe-55	938.153				938.153
Fe-59	0.071				0.071
H-3	21,606.963		11,550.000		33,156.963
Hg-203	0.002				0.002
I-125	37.841				37.841
I-129	0.001				0.001
I-131	0.002				0.002
In-111	0.301				0.301
Ir-192	0.011				0.011
Kr-85	134.505				134.505
Mn-54	159.174				159.174
Na-22	0.573				0.573
Nb-94	0.191				0.191
Ni-63	92.421				92.421
P-32	30.151				30.151
Pb-210	76.099				76.099
Pm-147	792.900				792.900
Po-208	0.002				0.002
Po-210	0.011				0.011
Pu-236	0.002				0.002
Pu-238	0.001				0.001
Pu-239	2.743	0.086			2.829
Pu-240	0.001				0.001

Table B-6 (Continued)

<u>Nuclide</u>	<u>Class AU</u>	<u>Class AS</u>	<u>Class B</u>	<u>Class C</u>	<u>Total</u>
Pu-242	0.001				0.001
Ra-226	235.919	1.710	1.459	496.229	735.317
Ra-228	0.003				0.003
Ru-106	0.002				0.002
S-35	8.008				8.008
Sb-124	10.000				10.000
Sb-125	0.003				0.003
Sc-46	1.502				1.502
Se-75	0.053				0.053
Sm-151	1,488.700				1,488.700
Sn-113	0.007				0.007
Sr-85	1.502				1.502
Sr-89	0.005				0.005
Sr-90	6.004				6.004
Th-228	0.001				0.001
Th-229	0.002				0.002
Th-230	0.001				0.001
Th-232	0.358				0.358
Th-NAT	0.002				0.002
Tl-204	2.128				2.128
U-235	0.088				0.088
U-238	262.187				262.187
U-DEP	0.636				0.636
U-NAT	0.008				0.008
Y-88	0.009				0.009
Zn-65	0.017				0.017
Total	27,015.775	2.221	11,551.459	521.229	39,090.684

Hospitals

<u>Nuclide</u>	<u>Class AU</u>	<u>Class AS</u>	<u>Class B</u>	<u>Class C</u>	<u>Total</u>
Ag-110	2.100				2.100
Ag-110m	0.052				0.052
Am-241	0.015				0.015
Au-195	2.151				2.151
Ba-133	0.002				0.002
C-14	1,302.610		4.000		1,306.610
Ca-45	342.112				342.112
Ca-47	0.049				0.049
Cd-109	0.004				0.004
Ce-141	12.625				12.625

Table B-6 (Continued)

<u>Nuclide</u>	<u>Class AU</u>	<u>Class AS</u>	<u>Class B</u>	<u>Class C</u>	<u>Total</u>
Ce-144	0.017				0.017
Ce-147	0.170				0.170
Cf-252	0.001				0.001
Cl-36	14.752				14.752
Cm-244	0.700				0.700
Co-56	0.001				0.001
Co-57	352.761				352.761
Co-58	0.327				0.327
Co-60	5.212				5.212
Cr-51	2,339.340				2,339.340
Cs-134	42.056				42.056
Cs-137	110.408				110.408
Cu-67	0.001				0.001
Eu-152	0.106				0.106
Eu-154	0.010				0.010
Eu-155	0.010				0.010
Fe-55	5.388				5.388
Fe-59	78.087				78.087
Ga-67	97.345				97.345
Gd-153	34.287				34.287
H-3	46,868.594		0.938		46,869.532
Hg-203	0.410				0.410
I-121	3.664				3.664
I-123	73.103				73.103
I-125	11,508.519				11,508.519
I-129	1.624				1.624
I-131	297.831				297.831
In-111	77.888				77.888
In-114	0.613				0.613
In-114m	1.410				1.410
Ir-192	1.201				1.201
Mn-54	0.888				0.888
Mo-99	0.252				0.252
Na-22	21.910				21.910
Nb-95	5.084				5.084
Ni-63	1.586		27.914		29.500
P-32	4,275.498				4,275.498
Pb-210	1.241				1.241
Po-208	0.020				0.020
Po-210	0.001				0.001
Ra-226	0.937	0.015			0.952
Rb-86	73.621				73.621
Rh-101	1.000				1.000
Rh-102	1.000				1.000
Ru-103	7.717				7.717

Table B-6 (Continued)

<u>Nuclide</u>	<u>Class AU</u>	<u>Class AS</u>	<u>Class B</u>	<u>Class C</u>	<u>Total</u>
S-35	3,122.638				3,122.638
Sb-125	0.014				0.014
Sc-46	18.933				18.933
Sc-47	0.001				0.001
Se-75	3.510				3.510
Sn-111	0.010				0.010
Sn-113	13.538				13.538
Sr-85	20.268				20.268
Sr-89	0.007				0.007
Sr-90	41.019		63.376		104.395
Tc-99	0.740				0.740
Tc-99m	982.697				982.697
Th-228	0.300				0.300
Tl-201	115.789				115.789
U-233	0.599				0.599
U-238	0.422				0.422
Xe-127	7.448				7.448
Xe-133	176.802				176.802
Y-90	4.020				4.020
Yb-169	0.215				0.215
Zn-65	0.235				0.235
Total	72,477.516	0.015	96.228		72,573.759

Industry

<u>Nuclide</u>	<u>Class AU</u>	<u>Class AS</u>	<u>Class B</u>	<u>Class C</u>	<u>Total</u>
Ag-110	1.255				1.255
Ag-110m	6.783				6.783
Am-241	25.959	0.050		17.953	43.962
Am-243	0.030				0.030
Au-195	5.109				5.109
Ba-133	27.752				27.752
Ba-140	0.001				0.001
Bi-207	0.011				0.011
Bi-210	0.033				0.033
C-14	117,918.358		70,768.656	188,687.014	
Ca-45	1,425.498			1,425.498	
Ca-47	0.070				0.070
Cd-109	308.909				308.909
Cd-113m	111.310				111.310
Cd-115	0.003				0.003

Table B-6 (Continued)

Nuclide	Class AU	Class AS	Class B	Class C	Total
Ce-139	0.247				0.247
Ce-141	5.136				5.136
Ce-144	7.156				7.156
Cf-252	0.001				0.001
Cl-36	210.704				210.704
Cm-244	0.004				0.004
Co-56	0.590				0.590
Co-57	1,175.422				1,175.422
Co-58	45.614				45.614
Co-60	2,009.639	0.001			2,009.640
Cr-51	2,803.910				2,803.910
Cs-134	42.789				42.789
Cs-137	610.095	0.001			610.096
Cu-67	0.002				0.002
Dy-159	0.393				0.393
Dy-165	0.001				0.001
Eu-152	3.807				3.807
Eu-154	4.531				4.531
Eu-155	0.923				0.923
Fe-53	0.200				0.200
Fe-55	1,637.147				1,637.147
Fe-59	56.225				56.225
Ga-67	114.507				114.507
Gd-153	210.883				210.883
Ge-68	60.380				60.380
H-3	2,491,494.902		55,882,500.000		58,373,994.902
Hf-181	0.008				0.008
Hg-203	35.953				35.953
I-123	112.002				112.002
I-124	26.010				26.010
I-125	31,415.644				31,415.644
I-128	1.760				1.760
I-129	12.453				12.453
I-131	207.558				207.558
In-111	232.354				232.354
In-114m	21.005				21.005
Ir-192	0.003				0.003
K-40	0.027				0.027
Kr-85	65,469.255				65,469.255
La-140	0.100				0.100
Mn-54	91.078				91.078
Na-22	511.210				511.210
Nb-94	7.595				7.595
Nb-95	10.422				10.422
Ni-59	0.259				0.259

Table B-6 (Continued)

<u>Nuclide</u>	<u>Class AU</u>	<u>Class AS</u>	<u>Class B</u>	<u>Class C</u>	<u>Total</u>
Ni-63	6,719.880		19,020.000		25,739.880
Ni-63AM	2,949.990				2,949.990
Np-237	0.147				0.147
P-32	41,574.622				41,574.622
P-33	0.926				0.926
Pb-210	0.006				0.006
Pm-147	160.249				160.249
Po-210	3,149.210				3,149.210
Pt-193	0.001				0.001
Pu-238	0.589			1.210	1.799
Pu-239	3.359			7.437	10.796
Pu-240	1.369			3.692	5.061
Pu-241	28.361			75.278	103.639
Pu-242	0.031			0.008	0.039
Ra-226	150.528	7.500		6.000	164.028
Ra-228	6.970				6.970
Rb-83	42.000				42.000
Rb-86	39.096				39.096
Ru-103	94.722				94.722
Ru-106	1.250				1.250
S-35	253,111.812				253,111.812
Sb-122	0.020				0.020
Sb-124	4.872				4.872
Sb-125	4.924				4.924
Sb-126	0.080				0.080
Sc-46	20.265				20.265
Se-75	37.404				37.404
Sn-113	48.395				48.395
Sn-117m	0.100				0.100
Sn-119	1.310				1.310
Sn-119m	5.882				5.882
Sr-85	5.973				5.973
Sr-89	1.074				1.074
Sr-90	60.270		25.000		85.270
Sr-95	1.630				1.630
Ta-182	0.748				0.748
Tc-99	438.870				438.870
Tc-99m	14.707				14.707
Te-123	39.976				39.976
Te-123m	20.000				20.000
Th-228	7.262				7.262
Th-230	0.557				0.557
Th-232	101.093				101.093
Th-NAT	7,912.253				7,912.253
Tl-201	11.961				11.961

Table B-6 (Continued)

<u>Nuclide</u>	<u>Class AU</u>	<u>Class AS</u>	<u>Class B</u>	<u>Class C</u>	<u>Total</u>
Tl-202	8.973				8.973
Tl-204	1.549				1.549
U-232	0.001				0.001
U-233	21.100				21.100
U-234	873.581				873.581
U-235	292.098				292.098
U-236	0.036				0.036
U-238	11,287.565				11,287.565
U-DEP	36.600				36.600
U-NAT	4,161.202				4,161.202
W-188	5.000				5.000
Xe-133	20.004				20.004
Y-88	1.580				1.580
Y-90	10.590				10.590
Yb-169	0.001				0.001
Zn-63	1.000				1.000
Zn-65	465.724				465.724
Zr-95	6.200				6.200
Total	3,052,448.533		7.552	55,901,520.000	70,905.234 59,024,881.319

Utilities

<u>Nuclide</u>	<u>Class AU</u>	<u>Class AS</u>	<u>Class B</u>	<u>Class C</u>	<u>Total</u>
Ag-108m				1.000	1.000
Ag-110	1,232.021				1,232.021
Ag-110m	8,318.449	0.244	179.000	8,518.900	17,016.593
Am-241	2.724	0.016	0.956	24.061	27.757
Am-243	0.040				0.040
Ba-133	0.016				0.016
Ba-140	251.158		296.000	12.901	560.059
Be-7	1,809.610			291.490	2,101.100
C-14	8,513.747	1.460	2,198.762	6,822.967	17,536.936
Cd-109	0.455				0.455
Ce-134	0.076				0.076
Ce-139	0.005				0.005
Ce-141	176.630		2.500	65.100	244.230
Ce-144	1,886.058	0.068	30.617	14,924.478	16,841.221
Cf-36	0.002				0.002
Cm-241	0.021				0.021
Cm-242	6.938	0.001	36.177	46.162	89.278
Cm-243	1.126	0.002	0.031	4.598	5.757

Table B-6 (Continued)

Nuclide	Class AU	Class AS	Class B	Class C	Total
Cm-244	0.677	0.002	1.067	0.049	1.795
Co-57	220.487	0.020	1,669.460	2,121.063	4,011.030
Co-58	102,189.084	2.210	168,284.032	172,821.710	443,297.036
Co-60	651,182.968	300.000	381,650.987	7,456,069.086	8,489,203.041
Cr-51	527,046.512		30,262.553	440,024.548	997,333.613
Cr-56	0.007				0.007
Cs-127	20.640				20.640
Cs-134	28,323.993	3.430	800,774.217	202,847.691	1,031,949.331
Cs-136	301.857		265.000	11.691	578.548
Cs-137	49,136.416	131.000	1,478,477.116	3,209,488.310	4,737,232.842
Cs-139	0.001				0.001
Cs-144	1.569			2.930	4.499
Eu-152	0.001				0.001
Eu-154	0.532				0.532
Eu-155	5.782			26.221	32.003
Fe-55	1,077,660.367	75.400	285,492.768	13,497,367.805	14,860,596.340
Fe-59	35,148.938		2,534.000	1,383.198	39,066.136
H-3	46,167.816	6.090	3,718.703	150,268.970	200,161.579
Hf-181	0.006				0.006
Hg-203	0.001				0.001
I-129	36.621		3.371	14.565	54.557
I-131	910.493		1,230.000	22.200	2,162.693
I-133	10.447				10.447
La-140	280.050		341.000		621.050
Mn-54	224,332.419	0.103	70,351.985	409,163.224	703,847.731
Mo-99	11.314				11.314
Nb-94	2.675			13.000	15.675
Nb-95	56,754.624		14,520.249	5,662.282	76,937.155
Nb-97	49.581				49.581
Nd-144	0.040				0.040
Ni-59	29.807	4.950	1,472.636	6,558.386	8,065.779
Ni-63	35,994.440	309.000	242,393.261	1,213,285.478	1,491,982.179
Ni-65	762.185				762.185
Np-237	0.482		0.003		0.485
Np-239			12.900		12.900
Pm-147	1,780.454			686,876.000	688,656.454
Pu-238	5.409	0.017	2.489	36.256	44.171
Pu-239	7.732	0.009	3.893	90.939	102.573
Pu-240	2.400	0.009	0.380	26.713	29.502
Pu-241	570.974	0.703	612.549	2,785.681	3,969.907
Pu-242	0.729		0.003	0.006	0.738
Ra-226	0.540				0.540
Rh-106	165.329				165.329
Ru-103	408.743		0.630	140.724	550.097
Ru-106	567.774		2.770	24,922.907	25,493.451

Table B-6 (Continued)

Nuclide	Class AU	Class AS	Class B	Class C	Total
Sb-122	3.448				3.448
Sb-124	7,543.888		48,749.350	4,517.139	60,810.377
Sb-125	5,030.879		7,320.659	15,584.084	27,935.622
Se-75	0.535				0.535
Sn-113	2,540.583		236.000	26.370	2,802.953
Sr-85	0.001				0.001
Sr-89	601.381		1,060.652	572.678	2,234.711
Sr-90	1,567.143	0.115	3,938.660	5,142,199.212	5,147,705.130
Sr-92	91.969				91.969
Tc-99	512.815		15.386	1,707.128	2,235.329
Tc-99m	0.102				0.102
Te-125m	1,368.886		51.000	2,941.260	4,361.146
Th-228				0.023	0.023
U-233	0.056				0.056
U-234	0.138			0.289	0.427
U-235	0.061			0.038	0.099
U-238	0.086			0.502	0.588
Xe-131m	6.446		20.600		27.046
Y-88	0.008				0.008
Zn-65	301,052.019		333,517.120	47.716	634,616.855
Zr-90	0.930				0.930
Zr-95	11,039.025		8,967.020	3,251.697	23,257.742
Zr-97	49.579				49.579
Total	3,193,701.970	834.849	3,890,698.512	32,683,591.426	39,768,826.757

APPENDIX C

ISOTOPIC DISTRIBUTION BY WASTE STREAM FOR U.S. ECOLOGY DISPOSAL FACILTIES

APPENDIX C

ISOTOPIC DISTRIBUTION BY WASTE STREAM FOR U.S. ECOLOGY DISPOSAL FACILITIES

This appendix presents radionuclide identities and quantities by waste stream and waste class for low-level wastes disposed during 1987, 1988, and 1989 at the two U.S. Ecology low-level waste disposal facilities. Tables C-1 through C-3 present isotopic distributions, by year, for the Richland, WA, disposal facility. Tables C-4 through C-6 present isotopic distributions, by year, for the Beatty, NV, disposal facility. All isotopic distributions are given in units of millicuries.

In the tables, "Class AS" waste denotes Class A wastes that have been disposed in a manner that meets the structural stability requirements of 10 CFR 61.56. "Class AU" waste denotes Class A wastes that have not been disposed in a manner that meets these structural stability requirements.

On U.S. Ecology shipment manifests, shippers identify the physical and chemical characteristics of a container of waste using an index code list. For wastes disposed during 1987, this index code list included the following waste stream descriptions:

Vials	Absorbed aqueous liquid
Dry solid	Absorbed organic liquid
Solidified liquid	Aqueous liquid in vials
Biological waste	Animal carcasses in sorbent
Filter media	Compacted dry active waste
Dewatered resin	Noncompacted dry active waste
Solidified resin	Other
Gas	

But starting in 1988, U.S. Ecology changed its shipment manifest to describe the wastes somewhat differently and to include additional waste stream descriptions. Thus, for 1988 and 1989, waste streams are described as follows:

Vials	Aqueous liquid in vials in sorbent
Dry solid	Animal carcasses in lime and sorbent
Solidified liquids	Gas
Biological (non-carcass waste)	Evaporator bottoms
Absorbed liquid	Compacted dry active waste
Resin material	Non-compacted dry active waste
Filter media	Cartridge-type filter media
Dewatered resins	Non-cartridge filter media
Solidified resins	Activated reactor hardware
Sorbed aqueous liquid	Solidified chelates
Sorbed non-aqueous liquid	Solidified oil
Non-aqueous liquid in vials in sorbent	Other

In early manifests, the index code list did not include a waste description specifically for activated metal wastes. During this time, U.S. Ecology kept informal track of delivery of activated metal wastes by assigning the designation Ni-63AM to Ni-63 disposed in activated metals. Otherwise, the following abbreviations are used in this appendix: TH-NAT denotes natural thorium (essentially Th-232), U-NAT denotes natural uranium, and U-DEP denotes depleted uranium.

Table C-1. Richland 1987 Isotopic Distribution (mCi) by Waste Stream

<u>Isotope</u>	<u>A_S_Activity</u>	<u>A_U_Activity</u>	<u>A_Activity</u>	<u>B_S_Activity</u>	<u>C_S_Activity</u>	<u>Total_Activity</u>
Waste Description: 01 VIALS						
C-14	.000		.201		.000	.201
CA-45	.000		.118		.000	.118
CO-57	.000		.002		.000	.002
CR-51	.000		.502		.000	.502
Fe-3	.000		7.788		.000	7.788
I-125	.000		2.039		.000	2.039
NB-95	.000		.002		.000	.002
P-32	.000		.026		.000	.026
S-35	.000		1.187		.000	1.187
SC-46	.000		.002		.000	.002
SN-113	.000		.002		.000	.002
SR-85	.000		.002		.000	.002
Ttals		.000		11.871		.000
						11.871

Table C-1 (Continued)

Isotope	A_S_Activity	A_U_Activity	A_Activity	B_S_Activity	C_S_Activity	Total Activity
Waste Description: 02 DRY SOLID						
AC-227	.000	.001	.001	.000	.000	.001
AC-228	.000	.052	.052	.000	.000	.052
AG-110M	.000	1.132 .388	1.132 .388	.000	1.432 .000	2.564 .388
AM-241	.001	64. 816	64. 817	4. 839	123. 693	193. 349
AM-243	.000	.000	.000	.000	.001	.001
AM-244	.000	.008	.008	.000	.000	.008
AU-193	.000	.000	.000	.000	.000	.000
AU-195	.000	.202	.202	.000	.000	.202
BA-133	.000	41. 654	41. 654	.000	.000	41. 654
BA-140	.000	78. 177	78. 177	.000	.000	78. 177
BB-7	.000	441. 506	441. 506	.000	372. 300	813. 806
BI-207	.000	4. 625	4. 625	.000	.000	4. 625
BI-210	.000	5. 142	5. 142	.000	.000	5. 142
BR-82	.000	.003	.003	.000	.000	.003
C-14	.000	.004	.004	.000	.000	.004
CA-4.5	.000	67. 669 .469	67. 675 .992	.006	1. 930 .176	69. 606 .174
CA-47	.000	288. 018	288. 018	.000	.000	288. 018
CD-10.9	.000	.113	.113	.000	.000	.113
CD-11.5	.000	90. 062	90. 062	.000	.000	90. 062
CE-1.39	.000	.100	.100	.000	.000	.100
CE-1.41	.000	.017	.017	.000	.000	.017
CE-1.44	.000	108. 666	108. 666	.000	.000	108. 666
CL-3.6	.002	1, 332. 564	1, 332. 566	17. 818	72. 400	1, 422. 784
CM-2.42	.000	19. 864	19. 864	.000	.000	19. 864
CM-2.43	.000	20. 861	20. 861	.003	33. 727	54. 591
CM-2.44	.000	1. 362	1. 362	.000	.000	1. 524
CO-5.7	.000	1. 649	1. 649	.000	.000	1. 810
CO-5.8	.000	2. 290. 576	2. 290. 576	1. 000	.000	2. 291. 576
CO-5.9	.000	17. 803. 997	17. 803. 997	.000	68. 610. 000	86. 413. 997
CO-6.0	.000	5. 000	5. 000	.000	.000	5. 000
CR-5.1	.000	86. 830. 284	87. 871. 074	7. 942	.000	6. 552. 976. 616
CS-1.31	.000	10. 050. 467	10. 050. 467	.000	6. 570. 000	16. 620. 467
CS-1.33	.000	1. 730	1. 730	.000	.000	1. 730
CS-1.34	.060	6. 944. 860	6. 944. 860	287. 520	.000	5. 000
CS-1.36	.000	5. 255	5. 255	.000	542. 000	7. 774. 380
CS-1.37	.000	32. 342. 806	32. 412. 906	21. 472. 235	133. 863. 800	5. 255
CU-6.7	.000	.245	.245	.000	.000	.245
EU-1.52	.000	28. 135	28. 135	.000	.000	28. 135
EU-1.54	.000	4. 638	4. 638	.000	.000	4. 638
EU-1.55	.000	42. 614	42. 614	9. 060	.000	94. 274
FE-5.5	.050	100. 392. 057	100. 392. 107	10. 894	4. 557. 149. 200	4. 657. 552. 201
FE-5.9	.000	709. 513	709. 513	.000	.000	709. 513
GA-6.7	.000	36. 492	36. 492	.000	.000	36. 492
GD-1.53	.000	43. 936	43. 936	.000	.000	43. 936
GD-1.59	.000	.030	.030	.000	.000	.030
GE-6.8	.000	9. 032	9. 032	.000	.000	9. 032

Table C-1 (Continued)

<u>Isotope</u>	<u>A_S_Activity</u>	<u>A_U_Activity</u>	<u>A_Activity</u>	<u>B_S_Activity</u>	<u>C_S_Activity</u>	<u>Total_Activity</u>
H-3	1.064	1.041.584.500	1.041.585.564	5.796.571.964	1.297.368	6.839.454.896
HF-181	.000	.143	.143	.000	.000	.143
HG-203	.000	1.035	1.035	.000	.000	1.035
I-123	.000	2.681	2.681	.000	.000	2.681
I-124	.000	.010	.010	.000	.000	.010
I-125	.000	27.597.589	27.597.589	.000	.000	27.597.589
I-129	.090	108.626	108.716	.040	.98.593	207.349
I-131	.000	1.479.905	1.479.905	.000	.000	1.479.905
I-132	.000	.800	.800	.000	.000	.800
I-133	.000	101.018	101.018	.000	.000	101.018
I-135	.000	1.140	1.140	.000	.000	1.140
IN-111	.000	118.753	118.753	.000	.000	118.753
IN-114M	.000	.037	.037	.000	.000	.037
IR-192	.000	.567	.567	.000	.000	.567
K-42	.000	343.273	343.273	.000	.000	343.273
KR-85	.000	.005	.005	.000	.000	.005
LA-140	.000	8.291.829	8.291.829	.000	.000	8.291.829
MN-54	.000	1.304.330	1.304.330	.000	.000	1.304.330
MO-99	.000	11.469.854	11.469.854	.000	.000	11.469.854
NA-22	.000	73.255	73.255	.000	.000	73.255
NA-24	.000	105.147	105.147	.000	.000	105.147
NA-94	.000	9.963	9.963	.000	.000	9.963
NB-95	.000	.010	.010	.000	.644	.644
NB-97	.000	2.571.412	2.571.412	.000	1.619.038	4.190.450
ND-147	.000	10.549	10.549	.000	.000	10.549
NI-59	.000	.041	.041	.000	.000	.041
NI-63	4.081.000	619.782	4.700.782	.000	5.140.000	9.840.782
NI-63AM	552.005	21.662.670	22.214.675	9.292.183	102.031.500	133.538.358
NI-65	.000	.000	.000	.000	167.647.000	167.647.000
NP-237	.000	.050	.050	.000	.000	.050
P-32	.000	1.420	1.420	.000	.031	1.451
P-33	.000	20.801.477	20.801.477	.000	.000	20.801.477
PA-233	.000	.085	.085	.000	.000	.085
PB-210	.000	.007	.007	.000	.000	.007
PB-212	.000	27.670	27.670	.000	.000	27.670
PB-214	.000	.059	.059	.000	.000	.059
PM-143	.000	.210	.210	.000	.000	.210
PM-147	.000	.001	.001	.000	.000	.001
PO-210	.000	10.897.012	10.897.012	204.902	559.500	11.661.414
PR-143	.000	46.507	46.507	.000	.000	46.507
PT-195	.000	.040	.040	.000	.000	.040
PU-238	.000	4.000	4.000	.000	.000	4.000
PU-239	.000	11.640	11.640	.392	2.992	15.024
PU-240	.000	43.166	43.166	4.726	28.605	76.497
PU-241	.000	16.809	16.809	1.241	13.885	31.935
RA-226	.000	2.144.607	2.144.607	.57.858	360.970	2.563.435
RB-83	12.545	1.491	1.491	.000	.031	1.522
	.000	266.657	279.202	1.505	2.687.693	2.968.400
	.000	19.000	19.000	.000	.000	19.000

Table C-1 (Continued)

Isotope	A_S Activity	A_U Activity	A_Activity	B_S Activity	B_Activity	C_S Activity	Total Activity
RB-86	.000	25.722	25.722	.000	.000	.000	25.722
RE-184	.000	.020	.020	.000	.000	.000	.020
RU-103	.000	81.460	81.460	.000	.000	.000	1.023.460
RU-106	.000	926.471	926.471	40.387	40.387	.000	1.124.658
S-35	.000	32.688.997	32.688.997	.000	.000	.000	32.688.997
SB-122	.000	.055	.055	.000	.000	.000	.055
SB-124	.000	23.386	23.386	.000	.000	.000	23.386
SB-125	.000	453.778	453.778	71.230	71.230	.000	641.008
SC-46	.000	41.942	41.942	.000	.000	.000	41.942
SC-47	.000	.003	.003	.000	.000	.000	.003
SE-75	.000	7.669	7.669	.000	.000	.000	7.669
SI-32	.000	.005	.005	.000	.000	.000	.005
SN-113	.000	89.866	89.866	.000	.000	.000	89.866
SN-118	.000	2.004	2.004	.000	.000	.000	2.004
SR-85	.000	11.308	11.308	.000	.000	.000	11.308
SR-89	.000	333.687	333.687	.000	.000	.000	333.687
SR-90	.000	3.098.264	3.098.264	24.082.150	24.082.150	4,826.953	32.007.367
SR-91	.000	23.110	23.110	.000	.000	.000	23.110
SR-92	.000	57.129	57.129	.000	.000	.000	57.129
SR-95	.000	.566	.566	.000	.000	.000	.566
TA-182	.000	4.282	4.282	.000	.000	.000	4.282
TB-158	.000	.037	.037	.000	.000	.000	.037
TB-160	.000	.001	.001	.000	.000	.000	.001
TC-99	.110	410.533	410.643	2.790	2.790	.000	546.466
TC-99M	.000	119.209	119.209	.000	.000	.000	119.209
TE-123M	.000	28.000	28.000	.000	.000	.000	28.000
TE-125M	.000	38.375	38.375	16.102	16.102	26.700	81.177
TE-127M	.000	.041	.041	.000	.000	.000	.041
TE-129M	.000	.041	.041	.000	.000	.000	.041
TH-228	.000	.103	.103	.000	.000	.000	.103
TH-229	.000	.004	.004	.000	.000	.000	.004
TH-230	.000	.140	.140	.000	.000	.000	.140
TH-232	.000	74.346	74.346	.000	.000	.000	74.346
TH-NAT	.000	9.771.854	9.771.854	.000	.000	.000	9.771.854
TL-201	.000	16.909	16.909	.000	.000	.000	16.909
TL-202	.000	2.234	2.234	.000	.000	.000	2.234
TL-204	.000	1.808	1.808	.000	.000	.000	1.808
U-208	.000	.077	.077	.000	.000	.000	.077
U-232	.000	.000	.000	.000	.000	.000	.002
U-233	.000	.000	.000	.000	.000	.000	.002
U-234	.000	.000	.000	.000	.000	.000	.002
U-236	.000	17.616	17.616	.058	.058	.035	16.318
U-238	.000	50.028	50.028	.008	.008	.002	50.071
U-NAT	.000	28.038.735	28.038.735	.078	.078	.002	.080
XE-127	.000	1,082.619	1,082.619	.018	.018	.000	1.082.619
XE-133	.000	4.688	4.688	.000	.000	.000	4.688
Y-88	.000	6.072	6.072	.000	.000	.000	6.072
Y-90	.000	.388	.388	.000	.000	.000	.388
		25.882	25.882				25.882

Table C-1 (Continued)

Isotope	A_S_Activity	A_U_Activity	A_Activity	B_S_Activity	C_S_Activity	Total_Activity
Y-91	.000	.042	.042	.000	.000	.042
YB-169	.000	7.893	7.893	.000	.000	7.893
ZN-65	.050	20.526	20.526	.107	.000	20.526
ZR-88	.000	5.000	5.000	.000	.000	5.000
ZR-89	.000	10.100	10.100	.000	.000	10.100
ZR-95	.000	1.051	1.051	.461	.635	1.686
ZR-97	.000	1.545	1.545	.000	.000	1.545
Totals:	5,764.392	1,579.750	1,579.750	402	5,852.158	5,852.158
					.871	.871
					11,830.588	11,830.588
					.569	.569
						19,268.262
						234

Table C-1 (Continued)

<u>Isotope</u>	<u>A_S Activity</u>	<u>A_U Activity</u>	<u>A_Activity</u>	<u>B_S Activity</u>	<u>C_S Activity</u>	<u>Total Activity</u>
Waste Description: 03 SOLIDIFIED LIQUIDS						
AG-110M	6.110	7.110	13.220	.000	.000	13.220
AM-241	4.299	4.644	8.943	.000	.308	9.251
AM-243	.000	.034	.034	.000	.000	.034
AU-195	.000	.107	.107	.000	.000	.107
BA-140	.000	.002	.002	.000	.000	.002
C-14	284.953	14.526	14.811	.000	6,516.100	21,327.371
CA-45	18.033	318	27.932	.000	.000	27.932
CD-109	.030	9.899	134.236	.000	.000	134.266
CE-141	.000	.001	.001	.000	.000	.001
CE-144	39.324	.388	39.712	.000	.000	39.712
CL-36	.084	89.386	89.470	.000	.000	89.470
CM-242	6.480	.624	7.104	.000	.000	7.561
CM-243	.001	.000	.000	.000	.000	.001
CM-244	4.697	.242	4.939	.001	.000	.001
CO-57	1.108	53.144	54.252	.000	.000	5.275
CO-58	493.555	6.522	957	7,016.512	.000	54.252
CO-60	.000	6.107	943	.000	.000	7,016.512
CR-51	1,647.423	6.107	943	7,755.366	.000	7,843.866
CS-134	26.701	3.177	997	3,204.698	.000	3,204.698
CS-136	388.980	5.719	888	6,108.868	.000	6,134.868
CS-137	.000	40.468	40.468	.000	.000	40.468
FE-55	1,615.590	14.651	884	16,267.474	.000	16,331.874
FE-59	835.466	3.947	798	4,783.264	.000	4,830.564
GA-67	.000	395.104	395.104	.000	.000	395.104
H-3	4,675.105	6.000	6.000	.000	.000	6.000
HG-203	.000	721.719	958	726.395	.063	22,751.395
I-123	.000	.500	.500	.000	.000	.500
I-125	.000	.260	.260	.000	.000	.260
I-129	6.912	4,546.197	4,553.109	.000	.000	4,553.109
I-131	5.389	63.450	68.839	.000	.000	68.839
LA-140	.000	343.487	343.187	100.000	.110	443.187
MN-54	.000	.001	.001	.000	.000	.001
NA-22	46.071	5,074.524	5,120.595	.000	.000	5,120.595
NB-95	.145	7.539	7.684	.000	.000	7.684
NB-97	.100	.700	.800	.000	.000	.800
ND-147	.000	.004	.004	.000	.000	.004
NI-59	.000	.001	.001	.000	.000	.001
NI-63	.000	10.347	10.347	.000	.000	10.347
NP-237	482.025	2,077.166	2,559.191	.000	.000	2,588.791
P-32	.000	.007	.007	.000	.000	.007
PM-147	.311	541.504	541.815	.002	.000	541.815
PO-220	.000	.002	.002	.000	.000	.002
PR-143	.000	.502	.502	.000	.000	.502
PU-38	.000	.001	.001	.000	.000	.001
PU-239	7.473	1.063	8.536	.000	.000	9.070
PU-240	8.902	4.031	12.933	.000	.000	13.569
	.006	1.841	1.847	.000	.000	1.847

Table C-1 (Continued)

<u>Isotope</u>	<u>A_S_Activity</u>	<u>A_U_Activity</u>	<u>A_Activity</u>	<u>B_S_Activity</u>	<u>C_S_Activity</u>	<u>Total_Activity</u>
PU-241	268.346	65.387	333.733	.000	19.000	352.733
PU-242	.000	.264	.264	.000	.000	.264
RA-226	2.968	.068	.036	.000	.000	3.036
RU-103	.000	.001	.001	.000	.000	.001
RU-106	.000	.001	.001	.000	.000	.001
S-35	9.469	1.132.197	1.141.666	.000	.000	1.141.666
SB-124	925.900	1.103.963	2.029.863	.000	.000	2.029.863
SB-125	.000	1.980.311	1.980.311	.000	.000	1.980.311
SC-46	.001	.000	.001	.000	.000	.001
SE-75	.002	2.183	2.185	.000	.000	2.185
SN-113	.001	.000	.001	.000	.000	.001
SR-85	.000	.199	.199	.000	.000	.199
SR-89	116	120.365	120.481	.000	.000	120.481
SR-90	27.441	33.946	61.387	.000	.000	63.127
TC-99	7.587	18.565	26.152	.000	.000	26.371
TC-19M	.000	20.025	20.025	.000	.000	20.025
TE-125M	.000	1.392	1.392	.000	.000	1.392
TE-127M	.000	.001	.001	.000	.000	.001
TE-128M	.000	.001	.001	.000	.000	.001
TH-232	.000	.046	.046	.000	.000	.046
TH-NAT	494.290	1.535	495.825	.000	.000	495.825
U-234	.000	.070	.070	.000	.000	.070
U-235	.000	12.582	12.582	.000	.000	12.582
U-238	.142	356.280	356.422	.000	.000	356.422
XE-131M	.000	.025	.025	.000	.000	.025
Y-91	.000	.001	.001	.000	.000	.001
ZN-65	86.541	417.769	504.310	.000	.000	504.310
ZR-95	.000	.501	.501	.000	.000	.501
Totals:	12,428.077	795.056.637	807.484.714	21,175.100.000	856,795.240	22,839,379.954

Table C-1 (Continued)

Isotope	A_S_Activity	A_U_Activity	A_Activity	B_S_Activity	C_S_Activity	Total_Activity
Waste Description: 04 BIOLOGICAL (NON-CARCASS WASTE)						
C-14	.000	5.202	5.202	.000	.000	5.202
CA-45	.000	.145	.145	.000	.000	.145
CE-141	.000	.511	.511	.000	.000	.511
CO-57	.000	2.459	2.459	.000	.000	2.459
CR-51	.000	2.483	2.483	.000	.000	2.483
GA-67	.000	.001	.001	.000	.000	.001
GD-153	.000	.069	.069	.000	.000	.069
H-3	.000	1.235	1.235	.000	.000	1.235
I-125	.000	12.273	12.273	.000	.000	12.273
I-131	.000	.118	.118	.000	.000	.118
IN-111	.000	.051	.051	.000	.000	.051
NB-95	.000	.014	.014	.000	.000	.014
P-32	.000	.024	.024	.000	.000	.024
SC-46	.000	.523	.523	.000	.000	.523
SN-113	.000	.002	.002	.000	.000	.002
SR-85	.000	.950	.950	.000	.000	.950
Tl-201	.000	.002	.002	.000	.000	.002
Totals:	.000	26.062	26.062	.000	.000	26.062

Table C-1 (Continued)

Isotope	A_S_Activity	A_U_Activity	A_Activity	B_S_Activity	C_S_Activity	Total_Activity
Waste Description: 07 FILTER MEDIA						
AG-110M	2,380.034		155.302	2,535.336		2,535.336
AM-241	.028		.047	.075	.247	.322
BA-140	.000		3.245	3.245		3.245
BE-7	.000		1.715	1.715		1,590.651
C-14	107.206		1,126.324	1,233.530	1,349.799	1,349.799
CD-109	.008		.008	.008	.000	.008
CE-144	54.886		461.504	516.390	74.370	590.760
CM-242	.239		.090	.329	.640	.969
CM-243	.000		.023	.023	.001	.024
CM-244	.053		.084	.137	.214	.351
CO-57	14.221		1.514	15.735	16.100	31.835
CO-58	5.202.824		1,159.299	6.362.123	22,911.330	29,273.453
CO-60	10.129.646		2,211.651	12,241.297	24,913.900	37,255.197
CR-51	149.935		269.833	419.768	3.670	423.438
CS-134	2,910.259		133.188	3,043.447	50.087.500	53,130.947
CS-136	.000		2.166	2.166	.000	2.166
CS-137	8.259.722		222.530	8,482.252	117.665.000	126,147.252
FE-55	13,018.963		4,335.937	17,354.900	39,830.600	57,185.500
FE-59	20.275		20.610	40.885	19.600	60.485
H-3	37.520		385.081	422.601	.000	422.601
I-129	3.954		.267	4.221	7.080	11.301
I-131	.000		.000	.000	887.102	887.102
MN-54	1,224.501		206.943	1,431.444	710.900	2,142.344
NB-95	719.266		154.181	873.447	1.440	874.687
NI-59	17.082		.188	17.270	.000	17.270
NI-63	2,748.573		506.976	3,255.549	22.900.700	26,156.249
PU-238	.130		.068	.198	1.024	1.222
PU-239	.051		.020	.071	.651	.722
PU-240	.000		.000	.019	.000	.019
PU-241	58.060		123.503	181.563	43.632	225.096
PU-242	.000		.001	.001	.000	.001
RU-103	53.560		2.374	55.934	.000	55.934
RU-106	.000		422.589	422.589	.000	422.589
SB-124	1,101.640		.038	1,101.678	458.000	1,559.678
SB-125	164.872		59.984	224.856	2,207.800	2,432.656
SN-113	6.970		4.600	11.570	.000	11.570
SR-89	.000		4.647	4.647	.000	4.647
SR-90	18.609		73.573	92.182	192.740	284.922
TC-99	9.058		.470	.9528	.9.064	18.592
TE-125M	1.121		.000	1.121	.000	1.121
XE-131M	.000		4.109	4.109	.000	4.109
XE-133	.000		9.180	9.180	.000	9.180
ZN-65	9.267		20.903	30.170	.000	30.170
ZR-95	185.431		99.026	284.457	.51.100	.000

Table C-1 (Continued)

Isotope	A_S_Activity	A_U_Activity	A_Activity	B_S_Activity	C_S_Activity	Total_Activity
Totals:	48,607.964	12,183.783	60,791.747	284,699.529	.000	345,491.276

Table C-1 (Continued)

Isotope	A_S_Activity	A_U_Activity	Dewatered Resins	A_Activity	B_S_Activity	C_S_Activity	Total Activity
AG-110M	.000	8,691,276	8,691,276	4,112,810	.000	12,804,086	
AM-241	.000	8,234	8,234	4,732	.000	12,966	
BA-133	.000	.011	.011	.000	.000	.011	
BA-140	.000	696,004	696,004	831,700	.000	1,527,704	
BE-7	.000	.013	.013	7,759,000	.000	7,759,013	
BI-207	.000	.001	.001	.000	.000	.001	
C-14	3,500	1,973,079	1,976,579	732,269	100,000	2,808,848	
CD-109	.000	8,302,065	8,302,065	.000	.000	8,302,065	
CE-141	.000	34,805	34,805	.235	.000	.35,040	
CE-144	486,600	624,297	1,110,897	547,774	700,000	2,356,671	
CM-242	.000	.404	.404	7,518	.000	7,922	
CM-243	.000	.142	.142	.000	.000	.142	
CM-244	.000	.023	.023	4,822	.000	4,845	
CO-57	.000	337,159	337,159	3,294,896	.000	3,632,055	
CO-58	2,020,300	63,865,186	65,885,486	838,544,700	21,700,000	926,130,186	
CO-60	821,400	204,213,998	205,035,398	187,991,800	133,700,000	526,727,198	
CR-51	.000	63,569,057	63,569,057	37,062	.000	63,606,119	
CS-134	983,200	4,105,950	5,089,150	266,242,300	35,900,000	307,231,450	
CS-136	.000	.024	.024	.000	.000	.024	
CS-137	1,879,800	12,786,275	14,666,075	556,083,700	64,400,000	635,149,775	
EU-152	.000	.040	.040	.000	.000	.040	
EU-154	.000	.042	.042	.000	.000	.042	
FE-55	404,400	28,514,551	28,918,951	87,925,700	45,900,000	162,744,651	
FE-59	.000	841,831	841,831	9,516,800	.000	10,358,631	
H-3	3,400	15,351,115	15,354,515	13,990,988	100,000	29,445,503	
HF-181	.000	1,173,672	1,173,672	.000	.000	1,173,672	
I-129	.001	3,089	3,090	13,564	.000	16,654	
I-131	.000	1,385,421	1,385,421	14,863,000	.000	16,248,421	
I-133	.000	.310	.310	.000	.000	.310	
LA-140	.000	371,351	371,351	5,672,620	.000	6,043,971	
MN-54	533,600	28,455,790	28,989,390	87,440,530	8,900,000	125,329,920	
NA-24	.000	.043	.043	.000	.000	.043	
NB-95	.000	42,449,757	42,449,757	282,698	.000	42,732,455	
NI-59	.000	.000	.000	39,100	.000	39,100	
NI-63	45,900	10,666,104	10,712,004	81,024,200	67,900,000	159,636,204	
NI-65	.000	6,590	6,590	.000	.000	6,590	
NP-237	.000	.006	.006	.000	.000	.006	
PM-147	9,070,390	9,070,390	9,070,390	.000	.000	9,070,390	
PU-238	.000	1,917	1,917	10,217	.000	12,134	
PU-239	.000	16,442	16,442	11,006	.000	27,448	
PU-240	.000	4,305	4,305	.000	.000	4,305	
PU-241	.000	229,502	229,502	684,000	1,000,000	1,913,502	
PU-242	.000	.001	.001	.000	.000	.001	
RU-103	.000	.000	.000	.276	.000	.276	
RU-106	.000	845,008	845,008	.000	.000	845,008	
SB-122	.000	.002	.002	.000	.000	.002	

Table C-1 (Continued)

<u>Isotope</u>	<u>A S. Activity</u>	<u>A U Activity</u>	<u>A Activity</u>	<u>B S. Activity</u>	<u>C S. Activity</u>	<u>Total Activity</u>
SB-124	78,962.800	4,450.823	83,413.623	64,298.000	.000	147,711.623
SB-125	.000	37,669.322	37,669.322	3,866.200	500.000	42,035.522
SC-46	.000	.001	.001	.000	.000	.001
SE-75	.000	.001	.001	.000	.000	.001
SN-113	.000	1,556.277	1,556.277	1,524.600	.000	3,080.877
SR-89	.000	10.044	10.044	16.240	300.000	326.284
SR-90	13,600	14,986.282	14,999.882	2,860.030	1,800.000	19,659.912
TC-39	.018	11.342	11.360	11.353	.000	22.713
TE-125M	.000	9,091.601	9,091.601	623.850	.000	9,715.451
U-235	.000	.030	.030	.000	.000	.030
U-238	.000	.058	.058	.000	.000	.058
XE-131M	.000	.197	.197	.000	.000	.197
XE-133	.000	30.378	30.378	.000	.000	30.378
ZN-65	.000	692.455.470	692.455.470	.000	.000	692.455.470
ZR-95	.000	24,286.584	24,286.584	158.215	.000	24,444.799
Totals:	86,158.519	1,292,143.692	1,378,302.211	2,241,028.505	382,900.000	4,002,230.716

Table C-1 (Continued)

Isotope	A_S_Activity	A_U_Activity	A_Activity	B_S_Activity	C_S_Activity	Total_Activity
Waste Description: 09 SOLIDIFIED RESINS						
AG-110M	621.610	2.900	624.510	668.060	.000	1,292.570
AM-241	.002	.002	.004	6.240	.000	6.244
BA-140	1.615		1.615	3,819.174	.000	3,820.789
C-14	185.496	180.515	366.011	225.972	.000	591.983
CE-141	.000	.000	.000	516.250	.000	516.250
CE-144	.000	.033	.033	.000	.033	.033
CM-242	.015	.008	.023	39.935	.000	39.958
CM-243	.002	.000	.002	19.830	.000	19.832
CM-244	.002	.002	.004	.180	.000	.184
CO-57	53.560	.000	53.560	.000	.000	53.560
CO-58	4,462.221	1,501.473	5,963.694	11,304.070	.000	17,267.764
CO-60	19,851.229	8,694.753	28,545.982	113,810.820	.000	142,356.802
CR-51	3,835.410	.016	3,835.426	120,444.490	.000	124,279.916
CS-134	1,207.564		1,324.129	27,612.680	.000	28,936.809
CS-137	1,941.273		2,905.133	112,854.110	.000	115,759.243
FE-55	6,473.189	6,619.041	13,092.230	191,842.020	.000	204,934.250
FE-59	1,628.153	71.940	73.140	.000	.000	73.140
H-3	.094	310.044	1,938.197	506.336	.000	2,444.533
I-129	.012	.643	.737	2.112	.000	2.849
I-131	.000	.000	.012	4,009.201	.000	4,009.213
I-133	.000	.000	.000	2.930	.000	2.930
LA-140	.865	.000	.865	452.720	.000	453.585
MN-54	8,078.604	4,204.990	12,283.594	28,312.630	.000	40,596.224
NB-95	1.203	.000	1.203	.000	.000	1.203
NI-59	10.758	.440	11.198	77.250	.000	88.448
NI-63	1,477.175	272.591	1,749.766	13,248.900	.000	14,998.666
PU-238	.002	.002	.004	14.940	.000	14.944
PU-239	.002	.002	.004	10.290	.000	10.294
PU-240	.002	.000	.002	.000	.000	.002
PU-241	.387	.050	.437	757.304	.000	757.741
RU-106	.000	1.596	1.596	.026	.000	1.622
SB-124	5.942	.300	6.242	.000	.000	6.242
SB-125	142.750	.000	142.750	.000	.000	142.750
SR-89	1.554	.000	1.554	9,458.650	.000	9,460.204
SR-90	2.261	1.975	4.226	1,348.273	.000	1,352.499
TC-99	.057	.653	.710	19.185	.000	19.895
ZN-65	925.804	231.911	1,157.715	32,604.610	.000	33,762.325
ZR-95	.979	.000	.979	.000	.979	.979
Totals	50,910.982	23,176.305	74,087.287	673,989.188	.000	748,076.475

Table C-1 (Continued)

Isotope	A_S Activity	A_U Activity	A_Activity	B_S Activity	C_S Activity	Total Activity
Waste Description:	10 SORBED	AQUEOUS LIQUID				
AG-110M	.000		5.241			5.241
BA-133	.000		38.025			38.025
BA-140	.000		15.747			15.747
C-14	.000		9,100.827			9,100.827
CA-45	.000		268.158			268.158
CD-109	.000		8.092			8.092
CE-141	.000		10.489			10.489
CR-144	.000		38.011			38.011
CL-36	.000		39.439			39.439
CO-57	.000		477.559			477.559
CO-58	.000		415.188			415.188
CO-60	.000		184.319			184.319
CR-51	.000		2.556.573			2.556.573
CS-134	.000		65.602			65.602
CS-137	.000		131.667			131.667
CU-64	.000		.001			.001
CU-67	.000		1.270			1.270
EU-154	.000		.001			.001
EU-155	.000		.001			.001
FE-55	.000		777.781			777.781
FE-59	.000		46.161			46.161
GD-153	.000		82.550			82.550
GE-68	.000		23.601			23.601
H-3	.000		107.572.661			107.572.661
HG-203	.000		6.377			6.377
I-123	.000		3.500			3.500
I-125	.000		12,508.206			12,508.206
I-129	.000		1.082			1.082
I-131	.000		376.289			376.289
IN-111	.000		19.679			19.679
IN-114M	.000		1.140			1.140
K-40	.000		.016			.016
K-42	.000		1.060			1.060
MN-54	.000		98.663			98.663
NA-22	.000		391.951			391.951
NB-95	.000		225.715			225.715
NI-63	.000		463.670			463.670
P-32	.000		60.498.179			60.498.179
P-33	.000		17.656			17.656
PA-233	.000		.001			.001
PB-210	.000		.011			.011
PM-147	.000		1.385			1.385
PO-209	.000		.011			.011
PO-210	.000		.103			.103
PU-241	.000		4.816			4.816
RA-226	.000		.266			.266

Table C-1 (Continued)

<u>Isotope</u>	<u>A. S. Activity</u>	<u>A. U. Activity</u>	<u>A. Activity</u>	<u>B. S. Activity</u>	<u>C. S. Activity</u>	<u>Total Activity</u>
RB-86	.000	25.058	25.058	.000	.000	25.058
RU-103	.000	9.519	9.519	.000	.000	9.519
S-35	.000	42.622	385	.000	.000	42.622
SB-125	.000	.181	.181	.000	.000	.181
SC-46	.000	9.480	9.480	.000	.000	9.480
SE-75	.000	59.743	59.743	.000	.000	59.743
SN-113	.000	141.897	141.897	.000	.000	141.897
SN-119	.000	6.122	6.122	.000	.000	6.122
SR-85	.000	12.469	12.469	.000	.000	12.469
SR-89	.000	8.780	8.780	.000	.000	8.780
SR-90	.000	2.377	2.377	.000	.000	2.377
TC-99	.000	14.388	14.388	.000	.000	14.388
TC-99M	.000	.010	.010	.000	.000	.010
TE-125M	.000	.080	.080	.000	.000	.080
TH-228	.000	.129	.129	.000	.000	.129
TH-232	.000	.112	.112	.000	.000	.112
TH-NAT	.000	.146	.146	.000	.000	.146
TL-204	.000	6.902	6.902	.000	.000	6.902
U-235	.000	2.024	2.024	.000	.000	2.024
U-238	.000	45.573	45.573	.000	.000	45.573
U-NAT	.000	1,465.965	1,465.965	.000	.000	1,465.965
Y-90	.000	.030	.030	.000	.000	.030
YB-169	.000	.008	.008	.000	.000	.008
ZN-65	.000	160.328	160.328	.000	.000	160.328
ZR-95	.000	85.337	85.337	.000	.000	85.337
Totals:	.000	241,157.783	241,157.783	.000	.000	241,157.783

Table C-1 (Continued)

Isotope	A_S_Activity	A_U_Activity	A_Activity	B_S_Activity	C_S_Activity	Total Activity
Waste Description: 11 SORBED NON-AQUEOUS LIQUID						
C-14	.000	20.460	20.460	.000	.000	20.460
CM-242	.000	.009	.009	.000	.000	.009
CO-58	.000	3.358	3.358	.000	.000	3.358
CO-60	.000	213.144	213.144	.000	.000	213.144
CR-51	.000	.369	.369	.000	.000	.369
CS-134	.000	35.465	35.465	.000	.000	35.465
CS-137	.000	89.223	89.223	.000	.000	89.223
FE-55	.000	235.172	235.172	.000	.000	235.172
FE-59	.000	.360	.360	.000	.000	.360
H-3	.000	69.857	69.857	.000	.000	69.857
I-129	.000	.426	.426	.000	.000	.426
KR-85	.000	1,001.000	1,001.000	.000	.000	1,001.000
MN-54	.000	37.800	37.800	.000	.000	37.800
NI-63	.000	32.985	32.985	.000	.000	32.985
PU-241	.000	.009	.009	.000	.000	.009
SB-125	.000	.891	.891	.000	.000	.891
SR-90	.000	8.402	8.402	.000	.000	8.402
TC-99	.000	.436	.436	.000	.000	.436
U-234	.000	2.402	2.402	.000	.000	2.402
U-235	.000	1.263	1.263	.000	.000	1.263
U-238	.000	.682	.682	.000	.000	.682
Y-90	.000	1.010	1.010	.000	.000	1.010
ZN-65	.000	9.211	9.211	.000	.000	9.211
Totals:	.000	1,763.934	1,763.934	.000	.000	1,763.934

Table C-1 (Continued)

Isotope	A_S_Activity	A_U_Activity	A_Activity	B_S_Activity	C_S_Activity	Total_Activity
Waste Description: 13 AQUEOUS LIQUIDS IN VIALS IN SORBENT						
AM-241	.000	.001	.001	.000	.000	.001
G-14	.000	678.429	678.429	.000	.000	678.429
CA-45	.000	1.353	1.353	.000	.000	1.353
CA-47	.000	.001	.001	.000	.000	.001
CD-109	.000	.650	.650	.000	.000	.650
CI-36	.000	.500	.500	.000	.000	.500
CO-57	.000	30.615	30.615	.000	.000	30.615
CO-58	.000	.455	.455	.000	.000	.455
CO-60	.000	.206	.206	.000	.000	.206
CR-51	.000	291.046	291.046	.000	.000	291.046
CS-137	.000	.200	.200	.000	.000	.200
FE-55	.000	.010	.010	.000	.000	.010
FE-59	.000	2.838	2.838	.000	.000	2.838
GA-67	.000	7.151	7.151	.000	.000	7.151
GD-153	.000	1.748	1.748	.000	.000	1.748
H-3	.000	3,001.192	3,001.192	.000	.000	3,001.192
I-123	.000	.005	.005	.000	.000	.005
I-125	.000	1,181.278	1,181.278	.000	.000	1,181.278
I-131	.000	61.998	61.998	.000	.000	61.998
IN-111	.000	1.220	1.220	.000	.000	1.220
IN-114M	.000	2.840	2.840	.000	.000	2.840
IR-192	.000	.315	.315	.000	.000	.315
MO-89	.000	12.504	12.504	.000	.000	12.504
NA-22	.000	1.639	1.639	.000	.000	1.639
NB-95	.000	7.221	7.221	.000	.000	7.221
NI-63	.000	.650	.650	.000	.000	.650
P-32	.000	223.317	223.317	.000	.000	223.317
PB-210	.000	.010	.010	.000	.000	.010
PM-147	.000	.063	.063	.000	.000	.063
PO-210	.000	.006	.006	.000	.000	.006
RB-86	.000	.340	.340	.000	.000	.340
RU-103	.000	6.493	6.493	.000	.000	6.493
S-35	.000	4,341.293	4,341.293	.000	.000	4,341.293
SC-46	.000	6.000	6.000	.000	.000	6.000
SE-75	.000	.089	.089	.000	.000	.089
SN-113	.000	5.722	5.722	.000	.000	5.722
SR-85	.000	.059	.059	.000	.000	.059
SR-90	.000	.065	.065	.000	.000	.065
TC-99	.000	16.000	16.000	.000	.000	16.000
TC-99M	.000	35.015	35.015	.000	.000	35.015
TL-201	.000	.002	.002	.000	.000	.002
U-238	.000	.260	.260	.000	.000	.260
YB-169	.000	.016	.016	.000	.000	.016
ZN-65	.000	.042	.042	.000	.000	.042

Table C-1 (Continued)

Isotope	A_S Activity	A_U Activity	A_Activity	B_S Activity	C_S Activity	Total Activity
Totals:	.000	9.920 .857	9.920 .857	.000	.000	9.920 .857

Table C-1 (Continued)

Isotope	A_S_Activity	A_U_Activity	A_V_Activity	B_S_Activity	C_S_Activity	Total Activity
Waste Description: 14 ANIMAL CARCASSES IN LIME AND SORBENT						
AG-110M	.000	.075	.075	.000	.000	.075
AU-195	.000	.001	.001	.000	.000	.001
BE-7	.000	.2,595	.2,595	.000	.000	2,595
C-14	.000	978,186	978,186	.000	.000	978,186
CA-45	.000	240,312	240,312	.000	.000	240,312
CD-109	.000	1,177	1,177	.000	.000	1,177
CE-141	.000	27,472	27,472	.000	.000	27,472
CL-36	.000	2,503	2,503	.000	.000	2,503
CO-57	.000	26,453	26,453	.000	.000	26,453
CO-60	.000	1,870	1,870	.000	.000	1,870
CR-51	.000	145,554	145,554	.000	.000	145,554
CS-134	.000	17,830	17,830	.000	.000	17,830
CS-137	.000	.141	.141	.000	.000	.141
CU-64	.000	.001	.001	.000	.001	.001
CU-67	.000	.052	.052	.000	.000	.052
FR-56	.000	57,864	57,864	.000	.000	57,864
FE-59	.000	21,275	21,275	.000	.000	21,275
GA-67	.000	1,722	1,722	.000	.000	1,722
GA-68	.000	.270	.270	.000	.000	.270
GD-153	.000	7,883	7,883	.000	.000	7,883
GE-68	.000	1,885	1,885	.000	.000	1,885
H-3	.000	11,785,717	11,785,717	.000	.000	11,785,717
HC-203	.000	.268	.268	.000	.000	.268
I-123	.000	177,836	177,836	.000	.000	177,836
I-124	.000	.012	.012	.000	.000	.012
I-125	.000	398,299	398,299	.000	.000	398,299
I-131	.000	45,695	45,695	.000	.000	45,695
IN-111	.000	162,960	162,960	.000	.000	162,960
IN-113M	.000	.002	.002	.000	.000	.002
IN-114	.000	.029	.029	.000	.000	.029
IN-114M	.000	2,944	2,944	.000	.000	2,944
MN-54	.000	.287	.287	.000	.000	.287
MO-99	.000	.006	.006	.000	.000	.006
NA-22	.000	1,688	1,688	.000	.000	1,688
NB-95	.000	20,555	20,555	.000	.000	20,555
NI-63	.000	9,000	9,000	.000	.000	9,000
P-32	.000	68,433	68,433	.000	.000	68,433
PB-203	.000	.015	.015	.000	.000	.015
PB-210	.000	.136	.136	.000	.000	.136
PO-210	.000	.055	.055	.000	.000	.055
RB-86	.000	40,637	40,637	.000	.000	40,637
RU-103	.000	19,414	19,414	.000	.000	19,414
S-35	.000	665,697	665,697	.000	.000	665,697
SC-46	.000	37,219	37,219	.000	.000	37,219
SE-75	.000	.619	.619	.000	.000	.619
SN-113	.000	26,603	26,603	.000	.000	26,603

Table C-1 (Continued)

Isotope	A_S Activity	A_U Activity	A Activity	B_S Activity	C_S Activity	Total Activity
SN-119	.000	8.000	8.000	.000	.000	8.000
SR-86	.000	30.204	30.204	.000	.000	30.204
SR-89	.000	24.700	24.700	.000	.000	24.700
TC-99	.000	62.642	62.642	.000	.000	62.642
TG-99M	.000	49.614	49.614	.000	.000	49.614
TL-201	.000	26.330	26.330	.000	.000	26.330
U-238	.000	.060	.060	.000	.000	.060
XE-133	.000	64.600	64.600	.000	.000	64.600
Y-88	.000	.018	.018	.000	.000	.018
Y-90	.000	1.001	1.001	.000	.000	1.001
ZN-65	.000	.917	.917	.000	.000	.917
Totals:	-----	-----	15,267.333	15,267.333	-----	.000
						15,267.333

Table C-1 (Continued)

<u>Isotope</u>	<u>A_S_Activity</u>	<u>A_U_Activity</u>	<u>A_Activity</u>	<u>B_S_Activity</u>	<u>C_S_Activity</u>	<u>Total_Activity</u>
Waste Description: 21 COMPACTED DRY ACTIVE WASTE						
AG-110M	.000	.040	.040	.000	.000	.040
C-14	.000	15.680	15.680	.000	.000	15.680
CO-58	.000	.150	.150	.000	.000	.150
CO-60	.000	264.850	264.850	.000	.000	264.850
CS-134	.000	9.290	9.290	.000	.000	9.290
CS-137	.000	21.970	21.970	.000	.000	21.970
FR-55	.000	198.620	198.620	.000	.000	198.620
H-3	.000	10.240	10.240	.000	.000	10.240
I-129	.000	.502	.502	.000	.000	.502
MN-54	.000	1.080	1.080	.000	.000	1.080
NB-95	.000	13.600	13.600	.000	.000	13.600
NI-63	.000	12.890	12.890	.000	.000	12.890
SB-125	.000	4.800	4.800	.000	.000	4.800
SR-92	.000	.540	.540	.000	.000	.540
TC-99	.000	.675	.675	.000	.000	.675
ZN-65	.000	64.730	64.730	.000	.000	64.730
ZR-95	.000	6.790	6.790	.000	.000	6.790
Totals:	--	626.447	626.447	.000	000	626.447

Table C-1 (Continued)

Isotope	A_S_Activity	A_U_Activity	A_Activity	B_S_Activity	C_S_Activity	Total_Activity
Waste Description:	22	NON-COMPACTED DRY ACTIVE WASTE				
BA-140	.000	17.230	17.230	.000	.000	17.230
C-14	.000	4.400	4.400	.000	.000	4.400
CE-141	.000	19.660	19.660	.000	.000	19.660
CM-242	.000	.250	.250	.000	.000	.250
CM-243	.000	.860	.860	.000	.000	.860
CO-58	.000	65.560	65.560	.000	.000	65.560
CO-60	.000	2.644.050	2.644.050	.000	.000	2.644.050
CR-51	.000	52.610	52.610	.000	.000	52.610
CS-134	.000	3.510	3.510	.000	.000	3.510
CS-37	.000	12.610	12.610	.000	.000	12.610
FE-55	.000	1.918.540	1.918.540	.000	.000	1.918.540
FE-59	.000	39.530	39.530	.000	.000	39.530
H-3	.000	37.090	37.090	.000	.000	37.090
I-129	.000	.005	.005	.000	.000	.005
I-131	.000	3.890	3.890	.000	.000	3.890
LA-140	.000	.001	.001	.000	.000	.001
MN-54	.000	1.053.500	1.053.500	.000	.000	1.053.500
NI-63	.000	292.670	292.670	.000	.000	292.670
PU-238	.000	.430	.430	.000	.000	.430
PU-239	.000	.320	.320	.000	.000	.320
PU-241	.000	17.600	17.600	.000	.000	17.600
SR-89	.000	2.360	2.360	.000	.000	2.360
SR-90	.000	.090	.090	.000	.000	.090
TC-99	.000	.060	.060	.000	.000	.060
ZN-65	.000	290.980	290.980	.000	.000	290.980
Totals:				.000	.000	.000
				6.477.906	6.477.906	6,477.906

Table C-1 (Continued)

<u>Isotope</u>	<u>A_S_Activity</u>	<u>A_U_Activity</u>	<u>A_Activity</u>	<u>B_S_Activity</u>	<u>C_S_Activity</u>	<u>Total_Activity</u>
Waste Description: 99 OTHER						
BA-133	.000	2,360	2,360	.000	.000	2,360
C-14	.000	70,031	70,031	.000	.000	70,031
CA-45	.000	10,557	10,557	.000	.000	10,557
CE-141	.000	1,008	1,008	.000	.000	1,008
CL-36	.000	.006	.006	.000	.000	.006
CO-57	.000	33,961	33,961	.000	.000	33,961
CO-58	.000	1,068	1,068	.000	.000	1,068
CO-60	.000	13,315	13,315	.000	.000	13,315
CR-51	.000	200,892	200,892	.000	.000	200,892
CS-37	.000	1,301	1,301	.000	.000	1,301
EU-152	.000	.900	.900	.000	.000	.900
FE-55	.000	.003	.003	.000	.000	.003
FE-59	.000	1,282	1,282	.000	.000	1,282
GA-67	.000	15,263	15,263	.000	.000	15,263
GD-153	.000	.600	.600	.000	.000	.600
H-3	.000	2,764,684	2,764,684	.000	.000	2,764,684
I-123	.000	12,733	12,733	.000	.000	12,733
I-125	.000	489,192	489,192	.000	.000	489,192
I-129	.000	.020	.020	.000	.000	.020
I-131	.000	50,883	50,883	.000	.000	50,883
IN-111	.000	7,850	7,850	.000	.000	7,850
KR-85	.000	209,630	209,630	.000	.000	209,630
MO-99	.000	20,500	20,500	.000	.000	20,500
NA-22	.000	2,084	2,084	.000	.000	2,084
NB-95	.000	.002	.002	.000	.000	.002
NI-63	.000	2,006	2,006	.000	.000	2,006
P-32	.000	542,107	542,107	.000	.000	542,107
RA-226	.000	22,500	22,500	.000	.000	22,500
RB-86	.000	.103	.103	.000	.000	.103
RU-103	.000	.303	.303	.000	.000	.303
S-36	.000	177,466	177,466	.000	.000	177,466
SE-75	.000	.044	.044	.000	.000	.044
SR-85	.000	4,001	4,001	.000	.000	4,001
SR-90	.000	.500	.500	.000	.000	.500
TC-99M	.000	61,464	61,464	.000	.000	61,464
TH-232	.000	.012	.012	.000	.000	.012
TH-NAT	.000	85,715	85,715	.000	.000	85,715
TL-201	.000	31,153	31,153	.000	.000	31,153
U-238	.000	139,776	139,776	.000	.000	139,776
U-NAT	.000	301,381	301,381	.000	.000	301,381
XE-133	.000	.122	.122	.000	.000	.122
Totals:	20,000	5,278,778	5,298,778	.000	.000	5,298,778

Table C-1 (Continued)

Isotope	A_S_Activity	A_U_Activity	A_Activity	B_S_Activity	C_S_Activity	Total Activity
GRAND TOTALS:	203,889.934	3,982,841.790	4,186,731.724	30,226,976.093	13,070,283.809	47,483,991.626

Table C-2. Richland 1988 Isotopic Distribution (mCi) by Waste Stream

Activated Reactor Hardware

Nuclide	Class AU	Class AS	Class B	Class C	Total
Am-241	1.123				1.123
Co-60	1,262.980	406.550			1,669.530
Cs-134		1.600			1.600
Cs-137	.718				.718
Eu-152		95.760			95.760
Eu-154		11.170			11.170
Fe-55	1,818.000				1,818.000
H-3	4,000.000				4,000.000
Mn-54	.100	3.820			3.920
Ni-59	3.240				3.240
Ni-63	378.000				378.000
Zn-65	5.000				5.000
Total	7,469.161	518.900			7,988.061

Animal Carcasses in Lime and Sorbent

Nuclide	Class AU	Class AS	Class B	Class C	Total
Ag-110m	.050				.050
Ba-133	.050				.050
Be-7	.030				.030
C-14	574.160				574.160
Ca-45	220.902				220.902
Ca-47	.001				.001
Cd-109	.573				.573
Ce-141	42.343				42.343
Ce-144	.142				.142
Cl-36	.216				.216
Co-57	20.292				20.292
Co-58	.230				.230
Cr-51	80.797				80.797
Fe-55	13.666				13.666
Fe-59	11.873				11.873
Ga-67	.008				.008
Gd-153	8.977				8.977
H-3	39,288.727				39,288.727
Hg-203	.043				.043
I-123	.031				.031

Table C-2 (Continued)

Nuclide	Class AU	Class AS	Class B	Class C	Total
I-125	348.496				348.496
I-131	104.450				104.450
In-111	17.954				17.954
In-113	.007				.007
In-114	2.532				2.532
In-114m	.684				.684
Kr-85	.015				.015
Mn-54	3.208				3.208
Mo-99	1.783				1.783
Na-22	17.300				17.300
Nb-95	12.466				12.466
P-32	24.608				24.608
Pb-203	.001				.001
Po-210	.018				.018
Pu-241	.096				.096
Ra-226	.153				.153
Rb-86	9.889				9.889
Ru-103	18.782				18.782
Ru-106	.090				.090
S-35	363.848				363.848
Sc-46	86.896				86.896
Sc-47	.001				.001
Se-75	5.658				5.658
Sn-113	30.218				30.218
Sn-119	4.500				4.500
Sr-85	30.343				30.343
Sr-90	14.308				14.308
Tc-99	10.640				10.640
Tc-99m	315.598				315.598
Th-228	.002				.002
Tl-201	18.382				18.382
Tl-202	1.100				1.100
Tl-204	.120				.120
Xe-131	81.600				81.600
Xe-133	715.167				715.167
Y-88	.007				.007
Y-90	.774				.774
Zn-65	1.781				1.781
Zr-85	.001				.001
Total	42,506.587				42,506.587

Table C-2 (Continued)

Aqueous Liquids in Vials in Sorbent

Nuclide	Class AU	Class AS	Class B	Class C	Total
Ag-110m	40.000				40.000
C-14	498.304				498.304
Ca-45	5.904				5.904
Ca-47	.002				.002
Cd-109	.500				.500
Cl-36	.990				.990
Co-57	116.031				116.031
Co-58	.069				.069
Co-60	.333				.333
Cr-51	92.069				92.069
Cs-137	1.000				1.000
Fe-59	1.344				1.344
Ga-67	40.003				40.003
H-3	3,758.525				3,758.525
I-123	.002				.002
I-125	2,690.609				2,690.609
I-129	.001				.001
I-131	73.342				73.342
In-111	11.601				11.601
Na-22	7.201				7.201
Nb-95	9.240				9.240
P-32	586.899				586.899
P-33	.500				.500
Rb-86	7.721				7.721
Ru-103	9.378				9.378
S-35	3,308.799				3,308.799
Sc-46	20.302				20.302
Se-75	1.150				1.150
Sn-113	26.860				26.860
Sr-85	.051				.051
Tc-99m	71.632				71.632
Tl-201	.003				.003
Y-88	.125				.125
Yb-169	.013				.013
Total	11,200.503				11,200.503

Biological (Non-Carcass Waste)

Nuclide	Class AU	Class AS	Class B	Class C	Total
C-14	130.972				130.972

Table C-2 (Continued)

Nuclide	Class AU	Class AS	Class B	Class C	Total
Cd-109	.003				.003
Ce-141	.609				.609
Ce-144	.016				.016
Co-57	15.769				15.769
Cr-51	4.915				4.915
Fe-59	.020				.020
Ga-67	.010				.010
Gd-153	.007				.007
H-3	6,671.349				6,671.349
I-123	.003				.003
I-125	36.407				36.407
I-131	.563				.563
In-111	.008				.008
In-114	.036				.036
Mn-54	.005				.005
Mo-99	.600				.600
Nb-95	.028				.028
P-32	.002				.002
Po-210	.258				.258
Ra-226	.095				.095
S-35	4.694				4.694
Sc-46	3.027				3.027
Sn-113	.525				.525
Sr-85	2.443				2.443
Sr-90	.023				.023
Tc-99m	.002				.002
Tl-201	.014				.014
Xe-133	.083				.083
Zn-65	.003				.003
Total	6,872.489				6,872.489

Cartridge-Type Filter Media

Nuclide	Class AU	Class AS	Class B	Class C	Total
Ag-110m	11.526	13,192.700		33,334.558	46,538.784
Am-241		.203	.033	.388	.624
Ba-140	.314				.314
Be-7	3.530			207.876	211.406
C-14	1,528.478	285.692	262.969	1,417.734	3,494.873
Ce-141				26.660	26.660
Ce-144	15.270	8.230	5.956	76.065	105.521
Cm-242		1.361	.165	1.983	3.509

Table C-2 (Continued)

Nuclide	Class AU	Class AS	Class B	Class C	Total
Cm-243		.023	.008	.006	.037
Cm-244		.156	.009	.322	.487
Co-57	.771	37.972	12.564	52.988	104.295
Co-58	206.122	33,854.007	2,422.860	15,096.301	51,579.290
Co-60	488.236	15,339.800	32,276.485	17,508.631	65,613.152
Cr-51	4.484	2,715.000	32.300	8,064.042	10,815.826
Cs-134	6.554	323.800	135.383	1,141.725	1,607.462
Cs-137	13.413	1,058.060	8,143.763	4,397.250	13,612.486
Fe-55	807.699	9,517.002	163,758.171	50,054.368	224,137.240
Fe-59	2.226	39.500	25.654	401.903	469.283
Ga-67	1.000				1.000
H-3	105,074.057	29.896	342.900	173.187	105,620.040
I-129	.024	.159	.093	.166	.442
I-131	5.556	117.000		3,520.000	3,642.556
La-140	.393			592.000	592.393
Mn-54	39.080	2,243.290	3,184.150	2,275.825	7,742.345
Nb-95	10.745	2,924.800	54.030	5,344.597	8,334.172
Ni-59	.238		18.069	34.847	53.154
Ni-63	202.327	2,836.800	3,937.700	6,804.253	13,781.080
P-32	.120				.120
Pm-147			13.510		13.510
Pu-238		.347	.027	.700	1.074
Pu-239		.363	.463	.755	1.581
Pu-240			.220	.042	.262
Pu-241	20.159	32.110	13.529	71.640	137.438
Pu-242			1.900	.015	1.915
Ru-103				.823	.823
Ru-106	.333		.847	1,029.000	1,030.180
S-35	.010				.010
Sb-124		2,414.000	1,164.000	1,105.000	4,683.000
Sb-125	14.167	1.150	40.430	32.945	88.692
Sn-113				.823	.823
Sr-89	.205	1.810	.235	5.529	7.779
Sr-90	.004	2.269	92,601.300	3.644	92,607.217
Tc-99	12.017	3.279	.376	6.654	22.326
Te-125m			7.100		7.100
Th-230			.001		.001
U-235			.002		.002
U-238			.002		.002
Xe-131m		4.750		14.100	18.850
Zn-65	1.156		18.620	30.216	49.992
Zr-95	7.795	852.000	30.340	2,764.210	3,654.345
Total	108,478.009	87,774.529	308,506.164	155,593.771	660,352.473

Table C-2 (Continued)

Compacted Dry Active Waste

Nuclide	Class AU	Class AS	Class B	Class C	Total
Ag-108	.001				.001
Ag-108m	2.545				2.545
Ag-110	.192				.192
Ag-110m	155.432	.050			155.482
Am-241	21.621			30.100	52.721
Au-195	1.005				1.005
Ba-133	.282				.282
Ba-140	7.316				7.316
Be-7	.022				.022
Bi-205	.002				.002
Bi-207	.433				.433
C-14	15,511.048	.190		.038	15,511.276
Ca-45	255.132				255.132
Ca-47	.258				.258
Cd-107	.011				.011
Cd-109	54.537				54.537
Cd-115	.001				.001
Ce-141	114.012				114.012
Ce-144	474.072			26.400	500.472
Cf-252	.144				.144
Ct-36	114.572				114.572
Cm-242	14.964			.001	14.965
Cm-243	.140				.140
Cm-244	.888				.888
Co-56	.795				.795
Co-57	238.224				238.224
Co-58	5,179.031	.370			5,179.401
Co-60	11,000.101	7.010		30.100	11,037.211
Cr-51	4,254.536				4,254.536
Cs-134	1,507.663	2.620		11.600	1,521.883
Cs-136	19.952				19.952
Cs-137	6,070.837	5.240		849.000	6,925.077
Dy-165	.100				.100
Eu-152	5.093				5.093
Eu-154	7.346				7.346
Eu-155	21.986			49.500	71.486
Fe-55	11,653.579	4.460		42.000	11,700.039
Fe-59	268.214				268.214
Ga-67	11.973				11.973
Ga-68	.939				.939
Gd-153	3.623				3.623
Ge-68	13.525				13.525
H-3	117,818.887	.250			117,819.137
Hf-181	.068				.068
Hg-203	4.117				4.117

Table C-2 (Continued)

Nuclide	Class AU	Class AS	Class B	Class C	Total
I-121	.002				.002
I-123	6.176				6.176
I-125	13,019.345				13,019.345
I-126	.005				.005
I-129	6.556	.040		.522	7.118
I-131	788.315				788.315
I-133	1.938				1.938
I-137	.400				.400
In-111	62.324				62.324
In-113	.001				.001
In-114	.418				.418
In-114m	.137				.137
Ir-192	4.193				4.193
Kr-85	.995				.995
La-140	6.202				6.202
Mn-54	1,758.112	.140			1,758.252
Mn-57	.001				.001
Mo-99	5.386				5.386
Na-22	106.636				106.636
Na-24	20.096				20.096
Nb-88	.010				.010
Nb-93	.004				.004
Nb-94	3.455				3.455
Nb-95	421.617	.420			422.037
Ni-59	3.568				3.568
Ni-63	3,957.627	.390		42.400	4,000.417
P-32	7,968.451				7,968.451
P-33	2.750				2.750
Pa-233	.006				.006
Pb-203	.001				.001
Pb-210	18.787				18.787
Pm-147	224.336			529.000	753.336
Po-208	.001				.001
Po-210	764.907				764.907
Pu-238	1.461			1.630	3.091
Pu-239	8.554			18.600	27.154
Pu-240	2.373			4.950	7.323
Pu-241	228.289			209.000	437.289
Pu-242	.404				.404
Ra-224	.010				.010
Ra-226	1.420				1.420
Rb-83	.362				.362
Rb-86	29.185				29.185
Ru-103	3.562				3.562
Ru-106	44.138			104.000	148.138

Table C-2 (Continued)

<u>Nuclide</u>	<u>Class AU</u>	<u>Class AS</u>	<u>Class B</u>	<u>Class C</u>	<u>Total</u>
S-35	8,121.201				8,121.201
Sb-122	.072				.072
Sb-124	680.552				680.552
Sb-125	66.982			107.000	173.982
Sc-46	21.150				21.150
Sc-47	.004				.004
Se-75	11.674				11.674
Sn-113	19.817				19.817
Sr-85	17.708				17.708
Sr-89	55.288				55.288
Sr-90	1,296.416			2,650.000	3,946.416
Sr-92	5.420				5.420
Ta-182	.930				.930
Tc-99	90.177			.154	90.331
Tc-99m	815.348				815.348
Te-123	16.019				16.019
Te-125	4.645				4.645
Te-125m	12.059			24.700	36.759
Th-228	.117				.117
Th-229	.010				.010
Th-232	11.590				11.590
Th-NAT	7.405				7.405
Tl-201	350.203				350.203
Tl-204	3.384				3.384
U-232	.401				.401
U-234	.419			.247	.666
U-235	10.917			.008	10.925
U-238	1,118.653			.055	1,118.708
U-NAT	20.771				20.771
W-181	.001				.001
Xe-127	13.256				13.256
Xe-133	81.220				81.220
Y-88	.031				.031
Y-90	1.485				1.485
Yb-169	.226				.226
Zn-65	2,381.798	8.140			2,389.938
Zr-95	292.163	.230			292.393
Zr-97	.060				.060
Total	219,811.307	29.550		4,731.005	224,571.862

Table C-2 (Continued)

Dewatered Resins

Nuclide	Class AU	Class AS	Class B	Class C	Total
Ag-110m	7,353.032		46,233.000	3,597.000	57,173.032
Am-241	1.636		.056	6.113	7.805
Ba-140	278.860	111.000	.005		389.865
Be-7	10.564				10.564
C-14	1,610.505	9.744	389.252	385.420	2,394.921
Ce-141	5.049	.191			5.240
Ce-144	1,204.808		1,397.000	4,457.400	7,059.208
Cm-242	4.067		.115	2.565	6.747
Cm-243	.098				.098
Cm-244	.066		.047	.825	.938
Co-57	37.459		381.000	375.000	793.459
Co-58	37,043.823	8,493.000	133,283.625	92,791.600	271,612.048
Co-60	206,579.051	44,757.000	84,361.405	178,120.700	513,818.156
Cr-51	76,350.712	37,800.000	2,378.000		116,528.712
Cs-134	21,915.985	1,550.000	277,605.500	773,060.000	1,074,131.485
Cs-136	15.371		.005		15.376
Cs-137	33,709.147	1,390.000	448,898.500	2,113,643.000	2,597,640.647
Cs-144	2.469				2.469
Eu-154	.604				.604
Eu-155	2.090				2.090
Fe-55	73,060.905	47,152.000	52,348.200	174,132.900	346,694.005
Fe-59	5,291.743	285.000	18.700		5,595.443
H-3	16,713.463	5.766	613.360	1,958.418	19,291.007
Hf-181	59.901		4.760		64.661
I-129	11.962	.034	2.271	10.402	24.669
I-131	803.705	36.700	6,654.030		7,494.435
I-133	.062				.062
La-140	373.626	120.000	.006		493.632
Mn-54	60,228.598	2,410.900	17,925.115	47,268.000	127,832.613
Nb-95	10,783.019	4,580.000	4,991.200	68.100	20,422.319
Ni-63	7,087.330	1,019.590	20,805.400	156,819.800	185,732.120
Pm-147	5,033.700			151,910.000	156,943.700
Pu-238	2.498		.162	7.379	10.039
Pu-239	8.031		.141	34.447	42.619
Pu-240	2.976			10.565	13.541
Pu-241	339.083		93.650	1,739.420	2,172.153
Pu-242	.005				.005
Ru-106	251.287			6,565.000	6,816.287
Sb-124	583.027	936.200	66,985.900	25.400	68,530.527
Sb-125	15,154.942	493.000	4,254.300	5,346.700	25,248.942
Sn-113	323.431	283.000	270.000	24.800	901.231
Sr-89	9.568		396.650	2,375.714	2,781.932
Sr-90	10,552.702	.215	760.455	581,058.000	592,371.372
Tc-99	67.142	.251	5.763	406.796	479.952
Te-125m	4,476.199	19.700	572.000	740.500	5,808.399

Table C-2 (Continued)

<u>Nuclide</u>	<u>Class AU</u>	<u>Class AS</u>	<u>Class B</u>	<u>Class C</u>	<u>Total</u>
U-233	.002				.002
U-234	.035			.063	.098
U-235	.019			4.564	4.583
U-238	.044			.082	.126
Xe-131			.039		.039
Xe-131m	13.208	.175	.002		13.385
Xe-133	10.200				10.200
Zn-65	343,392.061	56,500.000	128,600.000		528,492.061
Zr-95	5,646.357	4,580.000	2,353.600	26.400	12,606.357
Total	946,406.227	212,533.466	1,302,573.214	4,296,973.073	6,758,485.980

Dry Solid

<u>Nuclide</u>	<u>Class AU</u>	<u>Class AS</u>	<u>Class B</u>	<u>Class C</u>	<u>Total</u>
Ag-110	.116				.116
Ag-110m	213.668		2,370.000		2,583.668
Am-241	47.666		.228	30.086	77.980
Am-247	.073				.073
Au-195	.087				.087
Ba-133	23.631				23.631
Bi-207	.018				.018
Bi-210	.013				.013
C-14	41,006.877	2.000	76.500	3,298.404	44,383.781
Ca-45	68.079				68.079
Cd-109	19.475				19.475
Ce-139	.062				.062
Ce-141	2.552				2.552
Ce-144	7.203		43.512	1.390	52.105
Cf-252	.702				.702
Cl-36	63.091				63.091
Cm-242	.239		.321		.560
Cm-243	.084				.084
Cm-244	.027		.071		.098
Co-57	452.575				452.575
Co-58	668.660		1,610.000		2,278.660
Co-60	9,799.867	.005	855.480	460.402	11,115.754
Cr-51	2,478.526		96.600		2,575.126
Cs-134	532.880		1,906.000	406.000	2,844.880
Cs-137	2,337.377	.001	44,500.000	24,960.000	71,797.378
Cu-64	.011				.011
Cu-67	.013				.013
Eu-152	.092				.092

Table C-2 (Continued)

Nuclide	Class AU	Class AS	Class B	Class C	Total
Eu-154	.115				.115
Eu-155	.001				.001
Fe-55	7,101.553	.700	1,784.560	83.448	8,970.261
Fe-59	22.063				22.063
Ga-67	10.477				10.477
Gd-153	108.453				108.453
Ge-68	4.349				4.349
H-3	1,640,026.080	588.300	3,511,236.000	.003	5,151,850.383
Hg-203	1.001				1.001
I-121	.002				.002
I-123	6.852				6.852
I-125	9,063.605				9,063.605
I-129	.564		.352	.070	.986
I-131	363.759		3.260		367.019
In-111	30.732				30.732
In-114	.001				.001
In-114m	.610				.610
Ir-192	93.400				93.400
K-40	.002				.002
Kr-85	2,925.279				2,925.279
Mn-54	975.816		55.200		1,031.016
Na-22	45.810				45.810
Na-24	.200				.200
Nb-95	272.810		109.000		381.810
Ni-63	2,144.337		936.420	13.600	3,094.357
P-32	5,928.587				5,928.587
P-33	1.431				1.431
Pa-233	.001				.001
Pa-234	.001				.001
Pb-210	.013				.013
Pb-212	.002				.002
Pm-147	1,170.082		79.000	43.600	1,292.682
Po-210	22.560				22.560
Pu-238	.756		.159	.001	.916
Pu-239	3.167		1.588	.864	5.619
Pu-240	.548		.360	.220	1.128
Pu-241	24.891		34.400	12.000	71.291
Pu-242	.073				.073
Ra-226	139.945	.010	.016	428.990	568.961
Ra-228	.014				.014
Rb-83	17.000				17.000
Rb-86	9.313				9.313
Re-187	.001				.001
Rh-106	.130				.130
Ru-103	2.485				2.485

Table C-2 (Continued)

Nuclide	Class AU	Class AS	Class B	Class C	Total
Ru-106	8.555		5.798	9.550	23.903
S-35	12,317.510				12,317.510
Sb-122	.382				.382
Sb-124	5.173				5.173
Sb-125	40.719		285.100	100.000	425.819
Sc-46	5.966				5.966
Sc-50	.001				.001
Se-75	.622				.622
Sn-113	31.360		39.100		70.460
Sn-119m	177.576				177.576
Sr-81	.001				.001
Sr-85	4.399				4.399
Sr-89	27.666				27.666
Sr-90	67.928	.005	206,109.841	124,800.000	330,977.774
Ta-182	.068				.068
Tc-99	381.672		11.814	.981	394.467
Tc-99m	264.333				264.333
Te-123m	35.000				35.000
Te-125m	3.082		52.190	23.000	78.272
Th-228	.109				.109
Th-230	.043				.043
Th-232	489.163	.014			489.177
Th-NAT	21,454.449				21,454.449
Tl-201	15.854				15.854
Tl-202	2.020				2.020
Tl-204	2.062				2.062
Tl-208	.004				.004
Tl-210	.002				.002
U-234	.219				.219
U-235	46.931		.004	.001	46.936
U-236	.002				.002
U-238	12,575.395	.400	.004	.002	12,575.801
U-NAT	2,862.982				2,862.982
W-188	.001				.001
Xe-131m	.001		.150		.151
Xe-133	.003				.003
Y-88	.004				.004
Y-90	.041				.041
Yb-169	.050				.050
Zn-65	3,658.525				3,658.525
Zr-89	5.000				5.000
Zr-95	196.479		143.000		339.479
Total	1,782,923.887	591.435	3,772,346.028	154,672.612	5,710,533.962

Table C-2 (Continued)

Evaporator Bottoms

<u>Nuclide</u>	<u>Class AU</u>	<u>Class AS</u>	<u>Class B</u>	<u>Class C</u>	<u>Total</u>
Ag-110m	84.552				84.552
Am-241	.040				.040
C-14	61.374				61.374
Ce-141	300.170				300.170
Ce-144	.894				.894
Cm-242	.889				.889
Cm-243	.008				.008
Cm-244	.167				.167
Co-57	1.053				1.053
Co-58	4,216.151				4,216.151
Co-60	2,329.132				2,329.132
Cr-51	553.488				553.488
Cs-134	4,146.111				4,146.111
Cs-137	8,358.141				8,358.141
Fe-55	2,800.832				2,800.832
Fe-59	67.363				67.363
H-3	7,702.371				7,702.371
I-129	3.764				3.764
I-131	1.771				1.771
Mn-54	718.671				718.671
Nb-95	241.452				241.452
Ni-59	5.376				5.376
Ni-63	1,770.081				1,770.081
Pu-238	.062				.062
Pu-239	.040				.040
Pu-241	4.002				4.002
Pu-242	.073				.073
Ru-106	809.700				809.700
Sb-124	7,420.801				7,420.801
Sb-125	703.731				703.731
Sr-90	11.827				11.827
Tc-99	16.425				16.425
Te-125m	3.297				3.297
Xe-131m	.090				.090
Total	42,333.899				42,333.899

Gas

<u>Nuclide</u>	<u>Class AU</u>	<u>Class AS</u>	<u>Class B</u>	<u>Class C</u>	<u>Total</u>
Kr-85	63.098				63.098
Total	63.098				63.098

Table C-2 (Continued)

Non-Aqueous Liquids in Vials in Sorbent

<u>Nuclide</u>	<u>Class AU</u>	<u>Class AS</u>	<u>Class B</u>	<u>Class C</u>	<u>Total</u>
C-14	9.505				9.505
H-3	5.670				5.670
Total	15.175				15.175

Non-Cartridge Filter Media

<u>Nuclide</u>	<u>Class AU</u>	<u>Class AS</u>	<u>Class B</u>	<u>Class C</u>	<u>Total</u>
Ag-110m	.110				.110
C-14	283.843				283.843
Co-58	389.409				389.409
Co-60	2,674.685				2,674.685
Cr-51	471.680				471.680
Cs-137	1.337				1.337
Fe-55	23,607.317				23,607.317
Fe-59	216.126				216.126
H-3	2.268				2.268
I-129	.198				.198
Mn-54	3,679.502				3,679.502
Ni-63	661.663				661.663
Tc-99	.200				.200
Zn-65	8.248				8.248
Total	31,996.586				31,996.586

Non-Compacted Dry Active Waste

<u>Nuclide</u>	<u>Class AU</u>	<u>Class AS</u>	<u>Class B</u>	<u>Class C</u>	<u>Total</u>
Ag-108m	6.309				6.309
Ag-110m	49.779		325.000		374.779
Am-241	95.580		3.232	31.645	130.457
Ba-133	.171				.171
Ba-140	2.971				2.971
Bi-207	.001				.001
C-14	754.664		537.713	5.270	1,297.647
Ca-45	.059				.059
Cd-109	77.863				77.863
Ce-139	.001				.001
Ce-141	95.515				95.515

Table C-2 (Continued)

<u>Nuclide</u>	<u>Class AU</u>	<u>Class AS</u>	<u>Class B</u>	<u>Class C</u>	<u>Total</u>
Ce-144	464.887		5.098	56.870	526.855
Cf-36	.008				.008
Cm-242	.815		.850	.007	1.672
Cm-243	.030				.030
Cm-244	.022		.535	.395	.952
Co-57	104.299		.415		104.714
Co-58	1,116.420		674.860		1,791.280
Co-60	7,421.995		7,550.049	1,164.100	16,136.144
Cr-51	1,790.909		.075		1,790.984
Cs-134	796.651		2,979.600	194.540	3,970.791
Cs-137	3,227.647		21,412.000	3,910.000	28,549.647
Eu-152	.342				.342
Eu-154	.142				.142
Eu-155	19.364		4.510	54.760	78.634
Fe-55	10,502.160		15,809.133	1,042.400	27,353.693
Fe-59	161.126		.045		161.171
Ga-67	1.500				1.500
H-3	35,178.130		128.590	83.400	35,390.120
Hg-203	.001				.001
I-125	108.527				108.527
I-129	2.024		.317	6.865	9.206
I-131	284.028		.001		284.029
Kr-85	2,281.400				2,281.400
La-140	.003				.003
Mn-54	997.958		116.800		1,114.758
Mo-99	.004				.004
Na-22	.004				.004
Nb-94	.421				.421
Nb-95	176.427		228.287		404.714
Ni-59	.064				.064
Ni-63	935.624		15,309.219	1,272.310	17,517.153
P-32	13.647				13.647
Pm-147	220.047		70.180	820.000	1,110.227
Po-210	.001				.001
Pu-236	.010				.010
Pu-238	3.150		.953	3.520	7.623
Pu-239	7.870		2.602	24.470	34.942
Pu-240	2.534		.540	6.330	9.404
Pu-241	168.910		77.854	407.620	654.384
Pu-242	.002				.002
Ra-226	18.087				18.087
Ru-103	13.883		.008		13.891
Ru-106	171.302		11.794	153.400	336.496
S-35	9.232				9.232
Sb-122	.003				.003
Sb-124	647.451		1,161.000		1,808.451

Table C-2 (Continued)

<u>Nuclide</u>	<u>Class AU</u>	<u>Class AS</u>	<u>Class B</u>	<u>Class C</u>	<u>Total</u>
Sb-125	99.129		380.750	138.280	618.159
Sc-46	.009				.009
Se-75	.017				.017
Sn-113	.002				.002
Sn-119	.001				.001
Sr-89	7.069				7.069
Sr-90	1,201.566		48,426.200	6,094.000	55,721.766
Ta-182	.569				.569
Tc-99	5.146		6.427	10.564	22.137
Tc-99m	.007				.007
Te-125	.309				.309
Te-125m	13.603		85.810	31.810	131.223
Th-232	.012				.012
Th-NAT	6.147				6.147
Tl-204	.017				.017
U-234	.108		.022	.404	.534
U-235	4.888		.005	.032	4.925
U-238	135.121		.009	.092	135.222
Y-90	11.750				11.750
Zn-65	811.877		.057		811.934
Zr-95	133.298		126.138		259.436
Total	70,362.619		115,436.678	15,513.084	201,312.381

Other

<u>Nuclide</u>	<u>Class AU</u>	<u>Class AS</u>	<u>Class B</u>	<u>Class C</u>	<u>Total</u>
Am-241	2.610				2.610
C-14	141.640				141.640
Ce-144	16.150				16.150
Cl-36	.001				.001
Co-57	84.120				84.120
Co-58	15.060				15.060
Co-60	3,160.859		12.800		3,173.659
Cr-51	39.800				39.800
Cs-134	135.541				135.541
Cs-137	393.865		950.600		1,344.465
Eu-152	.131				.131
Eu-154	.130				.130
Fe-55	4,334.640				4,334.640
H-3	21.260				21.260
I-129	.181				.181

Table C-2 (Continued)

Nuclide	Class AU	Class AS	Class B	Class C	Total
Kr-85	18.258				18.258
Mn-54	16.710				16.710
Nb-95	7.650				7.650
Ni-63	199.260				199.260
Pb-210	.014				.014
Pm-147	.001				.001
Pu-239	.006	.348			.354
Ra-226	7.576	.140		146.400	154.116
Sr-90	2.608				2.608
Tc-99	1.221				1.221
Th-NAT	30.961				30.961
U-233	.001				.001
U-235	.001				.001
U-238	46.201				46.201
U-NAT	1.749				1.749
Zn-65	1,134.460				1,134.460
Total	9,812.665	.488	963.400	146.400	10,922.953

Solidified Chelates

Nuclide	Class AU	Class AS	Class B	Class C	Total
C-14	17.604				17.604
Co-60	65.174				65.174
Cs-134	10.958				10.958
Cs-137	143.957				143.957
Fe-55	205.211				205.211
Mn-54	.126				.126
Ni-63	92.010				92.010
Total	535.040				535.040

Solidified Liquids

Nuclide	Class AU	Class AS	Class B	Class C	Total
Ag-108m	1.268				1.268
Ag-110m	3.065				3.065
Am-241	.028	.001			.029
Ba-133	9.851				9.851
Bi-210		.001			.001

Table C-2 (Continued)

<u>Nuclide</u>	<u>Class AU</u>	<u>Class AS</u>	<u>Class B</u>	<u>Class C</u>	<u>Total</u>
C-14	7,634.733				7,634.733
Ca-45	34.268				34.268
Cd-109	60.146				60.146
Ce-144	.556	.001			.557
Cl-36	15.116				15.116
Cm-242	.518				.518
Cm-244	.171				.171
Co-57	28.147				28.147
Co-58	1,197.676				1,197.676
Co-60	1,903.287	.300			1,903.587
Cr-51	49.114				49.114
Cs-134	852.552				852.552
Cs-137	1,770.899				1,770.899
Fe-55	1,095.367				1,095.367
Fe-59	1.206				1.206
H-3	303,750.311		17,315,000.000		17,618,750.311
I-125	1,185.743				1,185.743
I-129	1.071				1.071
I-131	33.989				33.989
In-111	.250				.250
Ir-192	.199				.199
Mn-54	346.116				346.116
Na-22	36.442	.001			36.443
Na-24	.043				.043
Nb-94	.084				.084
Nb-95	.146				.146
Ni-59	.013	.140			.153
Ni-63	872.512				872.512
P-32	602.708				602.708
Pm-145		.001			.001
Po-210	.044				.044
Pt-193		.001			.001
Pu-238	.039				.039
Pu-239	.023				.023
Pu-241	2.894				2.894
Pu-242	.080				.080
Rb-86	.201				.201
S-35	2,280.002				2,280.002
Sb-124	76.478				76.478
Sb-125	928.131				928.131
Se-75	4.275				4.275
Sm-145		.001			.001
Sr-90	5.597	.001			5.598
Tc-99	14.099	.001			14.100
Te-125m	.442				.442

Table C-2 (Continued)

Nuclide	Class AU	Class AS	Class B	Class C	Total
Th-NAT	.094				.094
Tl-204		.001			.001
U-234		.001			.001
U-235	.694				.694
U-238	1.553	.002			1.555
Zn-65	2.931				2.931
Total	324,805.172	.453	17,315,000.000		17,639,805.625

Solidified Oil

Nuclide	Class AU	Class AS	Class B	Class C	Total
Ag-110m	121.542				121.542
Am-241	.391				.391
C-14	34.039	1.831			35.870
Cm-242	.228				.228
Cm-244	.397				.397
Co-58	.837	.355			1.192
Co-60	570.301	188.460			758.761
Cr-51	.005				.005
Cs-134	45.249	.294			45.543
Cs-137	520.383	7.619			528.002
Fe-55	473.527	394.750			868.277
H-3	145.619	.058			145.677
I-129	.674	.004			.678
Mn-54	1.496	15.144			16.640
Nb-95	.100				.100
Ni-63	44.005				44.005
Pu-238	.643	.014			.657
Pu-239	.559	.013			.572
Pu-241	22.118	3.576			25.694
Ra-226	.150				.150
Sb-125	.049				.049
Sr-89		16.610			16.610
Sr-90	9.615	6.610			16.225
Tc-99	1.715	.002			1.717
U-238	80.120	1.970			82.090
Zn-65	21.956				21.956
Total	2,095.718	637.310			2,733.028

Table C-2 (Continued)

Solidified Resins

Nuclide	Class AU	Class AS	Class B	Class C	Total
Am-241		.003	.002		.005
C-14	5,381.240	440.431	230.947		6,052.618
Cm-242		.048	.011		.059
Cm-243		.002			.002
Cm-244		.002			.002
Co-57		195.390	385.756		581.146
Co-58	730.731	12,538.000	6,811.289		20,080.020
Co-60	9,847.488	72,906.000	55,498.980		138,252.468
Cr-51	60.405	44.004			104.409
Cs-134		652.400	12,439.240		13,091.640
Cs-137	578.395	1,017.700	22,621.940		24,218.035
Fe-55	20,796.796	112,925.900	41,691.210		175,413.906
Fe-59	.155	1,529.300			1,529.455
H-3	2,299.966	99.845	1,760.617		4,160.428
I-129	1.951	.032	.021		2.004
Mn-54	5,561.138	9,320.310	14,284.560		29,166.008
Ni-59		44.146	198.937		243.083
Ni-63	1,071.712	6,872.010	18,947.720		26,891.442
Pu-238		.011	.006		.017
Pu-239		.014	.020		.034
Pu-240		.014	.020		.034
Pu-241		1.649	1.419		3.068
Sb-125		75.605			75.605
Sn-113			361.678		361.678
Sr-89		.356	156.191		156.547
Sr-90	17.890	7.829	135.493		161.212
Tc-99	1.062	.010	.038		1.110
Zn-65	50.150	710.270			760.420
Total	46,399.079	219,381.281	175,526.095		441,306.455

Sorbed Aqueous Liquids

Nuclide	Class AU	Class AS	Class B	Class C	Total
Ag-110m	.412				.412
Am-241	.001				.001
As-73	.909				.909
Au-195	.333				.333
Ba-133	1.602				1.602
Bi-207	.005				.005
C-14	7,542.611				7,542.611

Table C-2 (Continued)

Nuclide	Class AU	Class AS	Class B	Class C	Total
Ca-45	620.149				620.149
Ca-47	.001				.001
Cd-109	20.839				20.839
Ce-141	1.562				1.562
Cl-36	131.366				131.366
Co-57	683.017				683.017
Co-58	.404				.404
Co-60	60.176				60.176
Cr-51	2,256.851				2,256.851
Cs-134	.560				.560
Cs-137	7.120				7.120
Cu-67	.003				.003
Eu-152	.001				.001
Eu-154	.107				.107
Fe-55	357.601				357.601
Fe-59	14.476				14.476
Ga-67	2.004				2.004
Ga-68	.074				.074
Gd-153	29.913				29.913
Ge-68	7.054				7.054
H-3	112,875.754				112,875.754
Hg-203	5.088				5.088
I-123	19.000				19.000
I-125	14,919.459				14,919.459
I-129	.028				.028
I-131	50.852				50.852
In-111	33.108				33.108
In-114	.009				.009
In-114m	.248				.248
K-40	.083				.083
K-42	.001				.001
Kr-85	3.117				3.117
Mn-54	5.363				5.363
Na-22	392.110				392.110
Na-24	13.792				13.792
Nb-95	2.344				2.344
Ni-59	.001				.001
Ni-63	882.988				882.988
P-32	57,912.296				57,912.296
Pb-210	.169				.169
Pm-147	5.631				5.631
Po-210	.003				.003
Ra-226	1.283				1.283
Rb-83	1.000				1.000
Rb-86	68.230				68.230

Table C-2 (Continued)

Nuclide	Class AU	Class AS	Class B	Class C	Total
Ru-103	1.559				1.559
S-35	74,447.264				74,447.264
Sc-46	4.292				4.292
Se-75	5.481				5.481
Sn-113	17.385				17.385
Sn-119m	8.339				8.339
Sr-85	5.500				5.500
Sr-90	.479				.479
Tc-99	17.552				17.552
Tc-99m	.004				.004
Te-123m	5.000				5.000
Th-228	.664				.664
Th-232	.624				.624
Tl-201	.001				.001
U-238	3.250				3.250
U-NAT	411.250				411.250
Xe-133	16.000				16.000
Y-88	3.200				3.200
Y-90	1.000				1.000
Zn-65	28.748				28.748
Zr-95	.176				.176
Total	273,908.876				273,908.876

Sorbed Non-Aqueous Liquid

Nuclide	Class AU	Class AS	Class B	Class C	Total
Ba-133	.020				.020
C-14	27.767				27.767
Cm-242	.008				.008
Co-57	.010				.010
Co-58	.333				.333
Co-60	49.447				49.447
Cs-134	.261				.261
Cs-137	12.114				12.114
Fe-55	42.132				42.132
H-3	102.123				102.123
I-125	1.000				1.000
I-129	.049				.049
Mn-54	2.264				2.264
Na-22	.015				.015
Ni-63	4.363				4.363
P-32	2.000				2.000
Pu-241	.009				.009

Table C-2 (Continued)

<u>Nuclide</u>	<u>Class AU</u>	<u>Class AS</u>	<u>Class B</u>	<u>Class C</u>	<u>Total</u>
Sb-125	.736				.736
Sr-90	.008				.008
Tc-99	.055				.055
U-238	.030				.030
Total	244.744				244.744

Table C-3. Richland 1989 Isotopic Distribution (mCi) by Waste Stream

Isotope	A-S Activity	A U Activity	A Activity	B S Activity	C S Activity	Total Activity
Waste Descript. n: 02 DRY SOLID						
AG-106	.000	.002	.000	.000	.000	.002
AG-108M	.000	.000	.000	.000	.000	1.000
AG-110	.000	1.470	1.470	.000	.000	1.470
AG-110M	.000	405.768	405.768	179.000	.000	739.193
AM-241	.476	27.616	28.091	.141	44.426	72.794
AM-243	.000	.031	.031	.000	.000	.031
AS-73	.000	.520	.520	.000	.000	.520
AU-195	.000	4.612	4.612	.000	.000	4.612
BA-133	.000	27.074	27.074	.000	.000	27.074
BA-140	.000	86.827	86.827	.000	.000	86.827
BI-204	.000	5.000	6.000	.000	.000	6.000
BI-206b	.000	.010	.010	.000	.000	.010
BI-206	.000	.025	.025	.000	.000	.025
BI-207	.000	1.111	1.111	.000	.000	1.111
BI-210	.000	.034	.034	.000	.000	.034
C-14	.000	77.789	91.3	77.789	91.3	69,139.737
C-15	.000	.060	.060	.000	.000	.060
CA-4	.000	222.311	222.311	.000	.000	222.311
CA-47	.000	.101	.101	.000	.000	.101
CD-109	.000	58.313	58.313	.000	.000	58.313
CD-115	.000	.014	.014	.000	.000	.014
CE-139	.000	.130	.130	.000	.000	.130
CE-141	.000	111.222	111.222	.230	.230	123.504
CE-144	.000	422.863	422.863	3.380	3.380	736.017
CF-252	.000	.007	.007	.000	.000	.007
CL-36	.000	61.189	61.189	.000	.000	61.189
CM-242	.000	.625	.625	.024	.024	36.915
CM-243	.000	.002	.002	.000	3.682	3.684
CM-244	.000	1.278	1.278	.110	.001	1.389
CO-56	.000	.037	.037	.000	.000	.037
CO-57	.000	661.286	661.286	.420	.618.517	1,281.223
CO-58	.000	15,627.375	15,627.375	151.000	14,030.973	29,809.348
CO-60	.000	189,767.789	189,767.789	2,480.000	40,183.000	232,760.789
CR-51	.000	6,079.922	6,079.922	.553	6,041.726	12,122.201
CS-127	.000	20.640	20.640	.000	.000	20.640
CS-134	.000	4,023.205	4,023.205	2,530.000	310.680	6,863.785
CS-136	.000	1.771	1.771	.000	11.691	13.462
CS-137	.000	5,355.916	5,365.916	9,940.000	1,184.800	16,430.716
CS-141	.000	.001	.001	.000	.000	.001
DY-159	.000	.009	.009	.000	.000	.009
DY-165	.000	.001	.001	.000	.000	.001
EU-161	.000	.001	.001	.000	.000	.001
EU-152	.000	7.962	7.962	.000	.000	7.962
EU-154	.000	4.282	4.282	.000	.000	4.282
EU-155	.000	.367	.367	.200	.000	.367
FE-53	.000	.200	.200	.000	.000	.200

Table C-3 (Continued)

Isotope	A S Activity		A U Activity		A Activity		B S Activity		C S Activity		Total Activity	
FE-56	.000		177,972.173		177,972.173		7,270.000		126,380.000		311,632.173	
FE-58	.000		538.316		538.316		.000		526.396		1,064.712	
GA-67	.000		134.983		134.983		.000		.000		134.983	
GA-68	.000		1.406		1.406		.000		.000		1.406	
GD-163	.000		113.528		113.528		.000		.000		113.528	
GE-68	.000		52.215		52.215		.000		.000		b2.215	
H-3	.000		1,660.019	183	1,660.019	183	b4,344.209	938	2,788.260		b5,807.027	371
HF-175	.000		.002		.002		.000		.000		.002	
HF-181	.000		.096		.096		.000		.000		.096	
HG-203	.000		35.931		35.931		.000		.000		35.931	
I-121	.000		3.663		3.663		.000		.000		3.663	
I-123	.000		42.852		42.852		.000		.000		42.852	
I-124	.000		.010		.010		.000		.000		.010	
I-125	.000		16,743.511		16,743.511		.000		.000		16,743.511	
I-128	.000		1.760		1.760		.000		.000		1.760	
I-129	.000		8.983		8.983		.000		.000		8.983	
I-131	.000		438.169		438.169		.000		.000		438.169	
IN-111	.000		174.642		174.642		.000		.000		174.642	
IN-113	.000		.070		.070		.000		.000		.070	
IN-114	.000		.140		.140		.000		.000		.140	
IN-114M	.000		22.146		22.146		.000		.000		22.146	
IR-192	.000		.011		.011		.000		.000		.011	
KR-85	.000		1,796.286		1,796.286		.000		.000		1,796.286	
LA-140	.000		96.993		96.993		.000		.000		96.993	
MN-64	.000		9,994.286		9,994.286		51.800		3,280.800		13,326.886	
MO-99	.000		.050		.050		.000		.000		.050	
NA-22	.000		338.864		338.864		.000		.000		338.864	
NA-24	.000		.013		.013		.000		.000		.013	
NB-94	.000		.190		.190		.000		.000		.190	
NB-95	.000		4,474.144		4,474.144		5,870		3,946.162		8,426.176	
NB-96	.000		.010		.010		.000		.000		.010	
NI-59	.000		9.540		9.540		17,930.604		1,240		16,490	
NI-63	.000		2,949.990		2,949.990		24,697.914		13,891.000		56,519.418	
NI-63AM	.000		.016		.016		.000		.000		2,949.990	
NP-237	.000		9,775.768		9,775.768		.000		.000		.016	
P-32	.000		.826		.826		.000		.000		.826	
P-33	.000		.003		.003		.000		.000		.003	
PA-231	.000		.010		.010		.000		.000		.010	
PB-206	.000		76.989		76.989		.000		.000		.001	
PB-210	.000		831.006		831.006		.000		.000		.001	
PB-147	.000		.022		.022		.000		.000		.001	
PO-208	.000		.010		.010		.000		.000		.022	
PO-209	.000		3,156.157		3,156.157		.000		.000		3,156.157	
PO-210	.000		.001		.001		.000		.000		.001	
PT-193	.000		.001		.001		.000		.000		.001	
PU-236	.000		.001		.001		.000		.000		.001	
PU-238	.000		.951		.951		.202		.000		.348	
PU-239	.086		6.393		6.479		.000		10.904		17.383	
PU-240	.000		1.426		1.426		.000		3.693		5.119	

Table C-3 (Continued)

<u>Isotope</u>	<u>A-S Activity</u>	<u>A-U Activity</u>	<u>A Activity</u>	<u>B-S Activity</u>	<u>C-S Activity</u>	<u>Total Activity</u>
PU-241	.000	58.652	58.652	14.500	468.328	541.480
PU-242	.000	.031	.031	.000	.011	.042
RA-226	9.225	181.871	191.096	1.469	512.229	704.784
RB-83	.000	9.000	9.000	.000	.000	9.000
RB-86	.000	58.964	59.964	.000	.000	58.964
RE-187	.000	.002	.002	.000	.000	.002
RH-101	.000	1.000	1.000	.000	.000	1.000
RH-102	.000	1.000	1.000	.000	.000	1.000
RU-103	.000	18.230	18.230	.630	98.686	118.546
RU-106	.000	7.285	7.285	2.770	34.670	44.736
S-36	.000	47.266	47.266	.358	.000	47.266
SB-122	.000	.020	.020	.000	.000	.020
SB-124	.000	132.556	132.556	.000	33.949	166.505
SB-125	.000	862.146	862.146	222.000	618.310	1,603.456
SB-126	.000	.080	.080	.000	.000	.080
SC-41	.000	.050	.050	.000	.000	.050
SC-46	.000	21.570	21.570	.000	.000	21.570
SE-76	.000	2,215.717	2,215.717	.000	.000	2,215.717
SM-151	.000	1,488.700	1,488.700	.000	.000	1,488.700
SM-153	.000	22.810	22.810	.000	.000	22.810
SN-113	.000	186.131	186.131	.000	6.050	192.181
SN-117M	.000	.100	.100	.000	.000	.100
SN-119	.000	.310	.310	.000	.000	.310
SN-119M	.000	1.331	1.331	.000	.000	1.331
SR-85	.000	12.609	12.609	.000	.000	12.609
SR-89	.000	1.706	1.706	63.000	286.243	287.949
SR-90	.000	219.877	219.877	.376	145.413	428.666
SR-95	.000	1.630	1.630	.000	.000	1.630
TA-179	.000	.002	.002	.000	.000	.002
TA-182	.000	.050	.050	.000	.000	.050
TB-157	.000	.002	.002	.000	.000	.002
TB-158	.000	.002	.002	.000	.000	.002
TC-99	.000	390.877	390.877	9.750	7.099	407.726
TC-99M	.000	836.380	836.380	.000	.000	836.380
TE-123M	.000	20.000	20.000	.000	.000	20.000
TE-125M	.000	169.049	169.049	51.000	.000	220.049
TH-228	.000	.377	.377	.000	.023	.400
TH-230	.000	.558	.558	.000	.000	.558
TH-232	.000	97.062	97.062	.000	.000	97.062
TH-NAT	.000	7 335.414	7 335.414	.000	.000	7,335.414
TL-201	.000	112.261	112.261	.000	.000	112.261
TL-202	.000	8.973	8.973	.000	.000	8.973
TL-204	.000	5.139	5.139	.000	.000	5.139
U-233	.000	.017	.017	.000	.000	.017
U-234	.000	449.835	449.835	.000	.001	449.835
U-235	.000	88.343	88.343	.000	.000	88.343
U-236	.000	.036	.036	.000	.000	.036
U-238	.000	11.030.459	11.030.459	.000	.001	11.030.460
U-NAT	.000	1,027.495	1,027.495	.000	.000	1,027.495

Table C-3 (Continued)

<u>Isotopes</u>	<u>A_S Activity</u>	<u>A_U Activity</u>	<u>A Activity</u>	<u>B_S Activity</u>	<u>C_S Activity</u>	<u>Total Activity</u>
W-181	.000	.010	.010	.000	.000	.010
W-188	.000	5.000	5.000	.000	.000	5.000
XE-131M	.000	4.671	4.671	.000	.000	4.671
XE-133	.000	172.787	172.787	.000	.000	172.787
Y-88	.000	1.966	1.966	.000	.000	1.966
Y-90	.000	.111	.111	.000	.000	.111
YB-169	.000	.120	.120	.000	.000	.120
ZN-65	.000	99,622.429	99,622.429	.020	.23 .461	99,645.910
ZR-95	.000	2,168.068	2,158.068	3.020	2,248.704	4,409.792
Totals:	9.786	2,284,830.369	2,284,840.145	54,392,036.347	287,686.501	56,964,562.993

Table C-3 (Continued)

Isotope	A-S Activity	A-U Activity	A-Activity	B-S Activity	C-S Activity	Total Activity
Waste Description: 03 SOLIDIFIED LIQUIDS						
AG-110M	.000	47.029	47.029	.000	.000	47.029
AM-241	.000	1.888	1.888	.000	.000	1.888
BA-133	.000	.393	.393	.000	.000	.393
BA-140	.000	.728	.728	.000	.000	.728
C-14	.000	18,964.124	18,964.124	.000	1,949.963	20,914.087
CA-45	.000	36.3965	36.3965	.000	.000	36.3965
CD-109	.000	.009	.009	.000	.000	.009
CE-141	.000	.228	.228	.000	.000	.228
CL-36	.000	4.027	4.027	.000	.000	4.027
CO-56	.000	.466	.466	.000	.000	.466
CO-57	.000	12.301	12.301	.000	.000	12.301
CO-58	.000	3,884.669	3,884.669	.000	.000	3,884.669
CO-60	.000	4,335.229	4,335.229	.000	.000	4,335.229
CR-51	.000	673.117	673.117	.000	.000	673.117
CS-134	.000	1,125.012	1,125.012	.000	.000	1,125.012
CS-137	.000	1,868.199	1,868.199	.000	.000	1,868.199
EU-164	.000	.002	.002	.000	.000	.002
FE-55	.000	4,475.627	4,475.627	.000	.000	4,475.627
FE-59	.000	.002	.002	.000	.000	.002
H-3	.000	786,206.968	786,206.968	1,550,000	3,133	2,336,210.101
HG-203	.000	.001	.001	.000	.000	.001
I-123	.000	.002	.002	.000	.000	.002
I-125	.000	1,422.487	1,422.487	.000	.000	1,422.487
I-129	.000	.005	.005	.000	.000	.005
I-131	.000	31.306	31.306	.000	.000	31.306
IN-111	.000	.511	.511	.000	.000	.511
IR-192	.000	.004	.004	.000	.000	.004
KR-85	.000	.023	.023	.000	.000	.023
LA-140	.000	.838	.838	.000	.000	.838
MN-54	.000	616.905	616.905	.000	.000	616.905
NA-22	.000	11.302	11.302	.000	.000	11.302
NB-94	.000	.001	.001	.000	.000	.001
NB-95	.000	36.101	36.101	.000	.000	36.101
NI-63	.000	2,082.762	2,082.762	.000	.000	2,082.762
P-32	.000	147.826	147.826	.000	.000	147.826
PO-210	.000	2,300	2,300	.000	.000	2,300
PU-239	.000	.001	.001	.000	.000	.001
PU-240	.000	.001	.001	.000	.000	.001
PU-241	.000	.037	.037	.000	.000	.037
RA-226	.000	.048	.048	.000	.000	.048
RB-86	.000	.500	.500	.000	.000	.500
S-35	.000	9,480.976	9,480.976	.000	.000	9,480.976
SB-125	.000	38.691	38.691	.000	.000	38.691
SC-46	.000	1.610	1.610	.000	.000	1.610
SE-75	.000	17.356	17.356	.000	.000	17.356
SN-113	.000	.002	.002	.000	.000	.002

Table C-3 (Continued)

<u>Isotopes</u>	<u>A S Activity</u>	<u>A U Activity</u>	<u>A Activity</u>	<u>B S Activity</u>	<u>C S Activity</u>	<u>Total Activity</u>
SR-85	.000	1.500	1.500	.000	.000	1.500
SR-90	.000	.244	.244	.000	.000	.244
TC-99	.000	.095	.095	.000	.000	.095
TH-228	.000	.064	.064	.000	.000	.064
TH-232	.000	.011	.011	.000	.000	.011
TH-NAT	.000	18.560	18.560	.000	.000	18.560
U-234	.000	6.190	6.190	.000	.000	6.190
U-236	.000	.216	.216	.000	.000	.216
U-238	.000	203.343	203.343	.000	.000	203.343
XE-131M	.000	.005	.005	.000	.000	.005
Y-88	.000	.001	.001	.000	.000	.001
ZN-65	.000	6,432.336	6,432.336	.000	.000	6,432.336
ZR-95	.000	23.800	23.800	.000	.000	23.800
Totals:	.000	842,214.945	842,214.945	1,550,000.000	1,963,096	2,384,168.041

Table C-3 (Continued)

Isotope	A-S Activity	A-U Activity	A Activity	B-S Activity	C-S Activity	Total Activity
Waste Description: 04 BIOLOGICAL (NON-CARCASS WASTE)						
AM-241	.000	.015	.015	.000	.000	.015
BI-205	.000	.004	.004	.000	.000	.004
C-14	.000	361.129	361.129	.000	.000	361.129
CA-45	.000	2.500	2.500	.000	.000	2.500
CD-109	.000	.284	.284	.000	.000	.284
CE-141	.000	.796	.796	.000	.000	.796
CE-144	.000	.036	.036	.000	.000	.036
CL-36	.000	.050	.050	.000	.000	.050
CM-243	.000	.015	.015	.000	.000	.015
CM-244	.000	.015	.015	.000	.000	.015
CO-67	.000	14.485	14.485	.000	.000	14.485
CO-68	.000	.814	.814	.000	.000	.814
CO-60	.000	3.543	3.543	.000	.000	3.543
CR-61	.000	1.031	1.031	.000	.000	1.031
CS-134	.000	2.102	2.102	.000	.000	2.102
CS-137	.000	5.314	5.314	.000	.000	5.314
CU-67	.000	3.191	3.191	.000	.000	3.191
FE-55	.000	10.374	10.374	.000	.000	10.374
FE-59	.000	7.957	7.957	.000	.000	7.957
GA-67	.000	.156	.156	.000	.000	.156
GD-153	.000	.164	.154	.000	.000	.154
H-3	.000	1,823.968	1,823.968	.000	.000	1,823.968
I-123	.000	.004	.004	.000	.000	.004
I-125	.000	19.798	19.798	.000	.000	19.798
I-131	.000	2.514	2.514	.000	.000	2.514
IN-111	.000	.125	.125	.000	.000	.125
IN-114	.000	.001	.001	.000	.000	.001
MN-54	.000	.145	.145	.000	.000	.145
NA-22	.000	.166	.166	.000	.000	.166
NB-95	.000	.271	.271	.000	.000	.271
NI-63	.000	2.254	2.254	.000	.000	2.254
P-32	.000	1.712	1.712	.000	.000	1.712
PO-210	.000	.002	.002	.000	.000	.002
PU-238	.000	.015	.015	.000	.000	.015
PU-239	.000	.015	.015	.000	.000	.015
PU-240	.000	.015	.015	.000	.000	.015
PU-241	.000	.109	.109	.000	.000	.109
PU-242	.000	.015	.015	.000	.000	.015
RU-103	.000	.277	.277	.000	.000	.277
S-35	.000	6.683	6.683	.000	.000	6.683
SB-125	.000	.194	.194	.000	.000	.194
SC-46	.000	10.962	10.962	.000	.000	10.962
SN-113	.000	1.238	1.238	.000	.000	1.238
SR-85	.000	.872	.872	.000	.000	.872
SR-90	.000	.043	.043	.000	.000	.043
TC-99	.000	.007	.007	.000	.000	.007